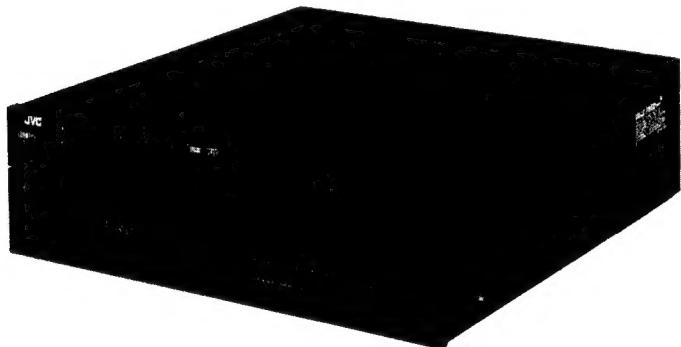


# JVC

# SERVICE MANUAL

LINEAR TRACKING FULLY AUTOMATIC TURNTABLE

MODEL QL-G90B



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# Safety Precautions

1. The design of this product contains special hardware, many circuits and components specially for safety purposes. For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.
2. Alterations of the design or circuitry of the product should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.
3. Many electrical and mechanical parts in the product have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of Service manual. Electrical components having such features are identified by shading on the schematics and by (Δ) on the parts list in Service manual. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list in Service manual may create shock, fire, or other hazards.
4. The leads in the products are routed and dressed with ties, clamps, tubings, barriers and/or the like to be separated from live parts, high temperature parts, moving parts and/or sharp edges for the prevention of electric shock and fire hazard.  
When service is required, the original lead routing and dress should be observed, and they should be confirmed to be returned to normal, after re-assembling.
5. Leakage current check  
(Safety for electrical shock hazard)  
After re-assembling the product, always perform an isolation check on the exposed metal parts of the products (antenna terminals, knobs, metal cabinet, screw heads, headphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.

Do not use a line isolation transformer during this check.

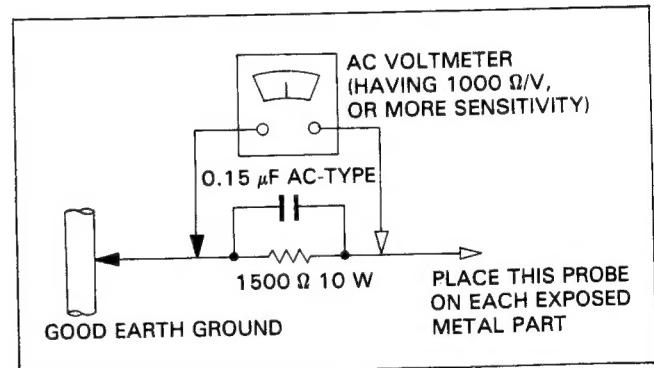
- Plug the AC line cord directly into the AC outlet. Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground. Any leakage current must not exceed 0.5 mA AC (r.m.s.).

## ● Alternate check method

Plug the AC line cord directly into the AC outlet. Use an AC voltmeter having 1,000 ohms per volt or more sensitivity in the following manner. Connect a  $1500 \Omega$  10 W resistor paralleled by a  $0.15 \mu F$  AC-type capacitor between an exposed metal part and a known good earth ground.

Measure the AC voltage across the resistor with the AC voltmeter.

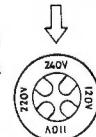
Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75 V AC (r.m.s.). This corresponds to 0.5 mA AC (r.m.s.).



## CHECKING YOUR LINE VOLTAGE (For U.S. Military Market and Other Countries)

Before inserting the power plug, please check this setting to see that it corresponds with the line voltage in your area. If it doesn't, be sure to adjust the voltage selector switch to the proper setting before operating this equipment. The voltage selector switch is located bottom board.

**CAUTION** Before selecting the "Voltage selector switch" to proper voltage disconnect the power plug.



# 1. Features

- Front-loading/front-control design
- Linear tracking for zero tracking error
- Double-Servo Quartz control
- Random programming of 8tracks for up to 15 plays
- Index play for sampling intros
- Plug-in cartridge connector

# 2. Specifications

## **Motor Section**

|                 |                                                                      |
|-----------------|----------------------------------------------------------------------|
| Motor           | : Quartz locked coreless FG servo motor                              |
| Drive system    | : Direct drive                                                       |
| Speeds          | : 33-1/3 rpm, 45 rpm                                                 |
| Wow and flutter | : 0.025% (WRMS)<br>0.015% (RMS, motor section measured by FG method) |
| S/N             | : 78 dB (DIN-B)                                                      |

## **Tonearm Section**

|                          |                                                             |
|--------------------------|-------------------------------------------------------------|
| Type                     | : Linear tracking statically balanced low mass straight arm |
| Effective length         | : 105 mm                                                    |
| Tracking error           | : +15'                                                      |
| <b>Cartridge Section</b> |                                                             |
| Model                    | : Z-45EP                                                    |
| Type                     | : Moving magnet (MM)                                        |
| Frequency response       | : 10 Hz—25,000 Hz                                           |

|                    |                                                                                                                                                                                                                                                     |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output             | : 2.5 mV (1 kHz)                                                                                                                                                                                                                                    |
| Channel separation | : 25 dB/1 kHz (test record: TRS-1)                                                                                                                                                                                                                  |
| Load resistance    | : 47 kohms                                                                                                                                                                                                                                          |
| Tracking ability   | : 70 $\mu$ m at 315 Hz                                                                                                                                                                                                                              |
| Compliance         | : $9 \times 10^{-6}$ cm/dyne                                                                                                                                                                                                                        |
| Stylus tip         | : 0.1 $\times$ 0.2 mm square block diamond elliptic stylus (0.3 $\times$ 0.7 mil)                                                                                                                                                                   |
| Stylus             | : DT-45E                                                                                                                                                                                                                                            |
| Tracking force     | : 1.25 g                                                                                                                                                                                                                                            |
| <b>General</b>     |                                                                                                                                                                                                                                                     |
| Dimensions         | : 340(W) $\times$ 108(H) $\times$ 356(D) mm<br>(13-1/16" $\times$ 4-5/16" $\times$ 14-1/16")<br>(Since the dimensions show only the design measurements, an allowance is required when installing the unit in a limited space such as a rack, etc.) |
| Weight             | : 8.6 kg (19.0 lbs)                                                                                                                                                                                                                                 |

*Design and specifications subject to change without notice.*

## **POWER SPECIFICATIONS**

| Countries            | Line Voltage & Frequency                    | Power Consumption |
|----------------------|---------------------------------------------|-------------------|
| U.S.A. & CANADA      | AC 120 V~, 60 Hz                            | 20watts           |
| CONTINENTAL EUROPE   | AC 220 V~, 50 Hz                            |                   |
| U.K. & AUSTRALIA     | AC 240 V~, 50 Hz                            |                   |
| U.S. MILITARY MARKET | AC 110/120/220/ 240 V~ selectable, 50/60 Hz | 18watts           |
| OTHER AREAS          | AC 110/120/220/240 V~ selectable, 50/60 Hz  |                   |

### 3. Controls and Functions

#### ① POWER

Press this button to apply power to the unit. The display window shows "O", indicating that power is on (■ ON). To switch off (■ STAND BY) the unit, press this button once more. The "O" will go out.

**Note:** This unit has a power consumption of 2.5 W even when the power was turned off by means of the POWER switch. Therefore, if the unit is not to be used for a long time, remove the AC plug from the outlet. If a convenience outlet of an amplifier is used, the AC plug of the amplifier should be disconnected also. If the POWER switch is depressed while the platter is in the extended position or the tonearm has not returned to its rest, the POWER will not be switched off before the platter is drawn in and the tonearm has returned to its rest position.

#### ② SPEED

33: Platter rotates at 33-1/3 rpm regardless of the type of record.  
 AUTO: The unit automatically selects 33-1/3 rpm for 30-cm records and 45 rpm for 17-cm records.  
 45: Platter rotates at 45 rpm regardless of the type of record.

#### ③ CLEAR

This button is used to clear the playback memory. When this button is pressed during programmed playback of a track, playback is released.

**Note:** Pressing the START/STOP or the OPEN/CLOSE button during playback also results in clearing the memory and releasing playback.

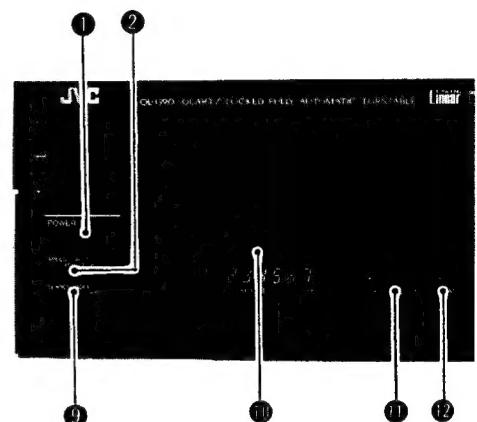
#### ④ REPEAT

This button is pressed for REPLAY. When pressed, the REPEAT indicator lights up. As long as the REPEAT indicator is lit, the record will be repeated continuously. By using the program memory, a selection of up to 15 tracks can be played back repeatedly in the designated order. To discontinue replay, press the REPEAT button once more to turn off the REPEAT indicator or press either the START/STOP or OPEN/CLOSE button.

#### ⑤ INDEX

If you wish to know the content of a certain program press this button to play back only the introduction of that program. This feature will play back the first 10 seconds of each program, in the order of the programs selected when the Program Select function has been used, and in numerical order from the first program when such is not the case.

Press the CLEAR button, the START/STOP button, or the OPEN/CLOSE button to disengage the INDEX function.



#### ⑥ SKIP

This button is used to interrupt playback of a track and proceed directly to the next.

**Note:**

- During manual playback the skip function is inactive.
- When a number of tracks is programmed, the skip function will cause playback from the next programmed track.

#### ⑦ UP/DOWN

Pressing this button while the tonearm is raised lowers it and pressing the button while the tonearm is on the disc will raise the tonearm. Use this control for temporary interruption of playback or to lower the tonearm onto the record during manual playback, after it was moved by means of the "<" or ">" buttons.

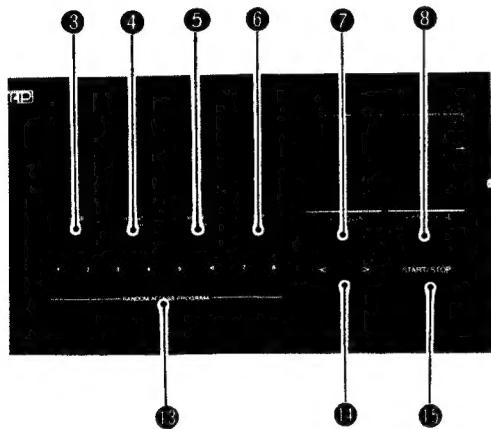
**Note:** If playback was temporarily interrupted by means of the UP/DOWN button during automatic playback, the SKIP button can be used to proceed to the next track.

**⑧ OPEN/CLOSE**

Pressing this button causes the platter to slide out or to retract.

**⑨ SENSOR**

L : If the tonearm sets down before the beginning of the designated track, set the switch to this position.



**NORM:** During normal operation, the switch should be set to this position.

H : If the tonearm passes over the designated track, set the switch to this position.

**Note:** When the position of the SENSOR switch was changed, always slide the platter out and in again, and then cause the tonearm to perform search operation.

**⑩ Display Panel****Power On:**

"0" is displayed in red at left.

**Automatic Playback:**

The number of the track presently playing is displayed in red at left.

**Programmed Playback:**

Starting from left, the numbers of programmed tracks are displayed in the designated order. The track to be played first or the track presently playing is indicated in red, the other tracks in orange color. Up to 15 tracks can be programmed, but the display covers 8 tracks.

**Manual Playback:**

All indicators are out.

**⑪ Quartz Lock Indicator**

When the platter rotation is stabilized by the quartz lock circuit, the "Quartz" logo will light up.

**⑫ REPEAT Indicator**

When the REPEAT button is pressed, this indicator lights up in red. While the indicator is lit, the record will be repeated continuously.

**⑬ RANDOM ACCESS PROGRAM**

Choose the desired track number for programmed playback with these buttons. The unit can differentiate between up to 8 tracks for one side of a record, and a maximum of 15 track number entries can be stored in the memory. If more than 8 tracks are programmed, the first 8 are displayed, and the display moves one step to the left every time a track is completed.

**⑭ <•>**

During manual playback, the tonearm can be moved to the left or right with these buttons. The tonearm keeps moving for as long as the button is depressed and stops when the button is released.

**⑮ START/STOP**

This button is used to start automatic playback or to interrupt playback of a record. Pressing it during standby initiates "Start" and pressing it during playback initiates "Stop".

**Note:** Pressing the START/STOP button during repeat playback or programmed playback results in cancellation of the respective operation.

## 4. Servicing Precautions

1. If the tonearm, motor or any other mechanical parts were detached, disassembled or replaced, always perform check and adjustment of lead-in position.
2. Be sure to perform servicing related to motor revolution only on a level surface.
3. As the rotor of the drive motor is magnetic, special care must be taken not to contaminate the rotor during servicing by attracting metallic particles or the like.
4. The power cord is connected to the primary leads of the power transformer by means of crimp-on terminals. If this connection has to be removed, re-establish it only with crimp-on connectors and confirm that secure connection has been established.
5. For check procedures of the logic circuit, refer to "Check Procedure of Main PCB" on page 1-11.
6. This unit employs the lubricators and bonds specified below. Be sure to use only the designated types.

| Brand                                                      | Application                                                                                                                                                                                 |
|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Furoil<br>GP-501A<br>Furoil<br>BG-TS-1<br>(Kanto Kasei Co) | (A)<br>1:1 Ratio<br>Worm and worm gear teeth contact area<br>Bearings on both sides of worm assembly<br>Gustand mesh section<br>Rack gear mesh section<br>Roller section at rear of tonearm |
| White Grease                                               | (B)<br>V-groove of loading guide                                                                                                                                                            |
| Furoil<br>GP-608                                           | (C)<br>Shaft A, Shaft B                                                                                                                                                                     |

## 5. Technical Explanation

### 5-(1) Programmed Music Scan

As opposed to conventional designs, this unit does not use a sensor incorporated into the cartridge, but employs a separate sensor which moves in sync with the tonearm, as shown in the illustration.

#### 1. Detector circuit

This circuit operates in the same way as described in "Optical Detection in UP Position" of the Service Manual for model QL-E55 (No. 2665 Mar. 1983) published previously.

#### 2. Music scanning

When the turntable is activated - except in the manual mode - the tonearm and sensor scan the total record area from the outside to the inside before playback, and the position of the intervals (MARKER SPACE) between musical tracks are stored in the microprocessor (by number of pulses in the rotary encoder). During programmed playback, these data are used to lower the tonearm at the beginning of a designated track and lift it at the end of the track.

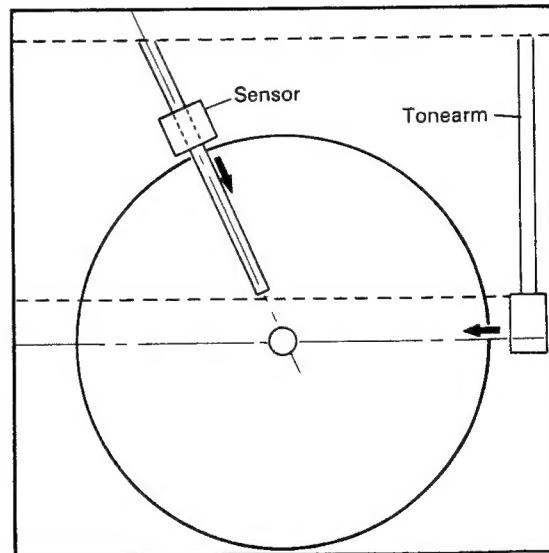


Fig. 1

## 5-(2) Explanation of Microprocessor Pins (MB88401M/292K)

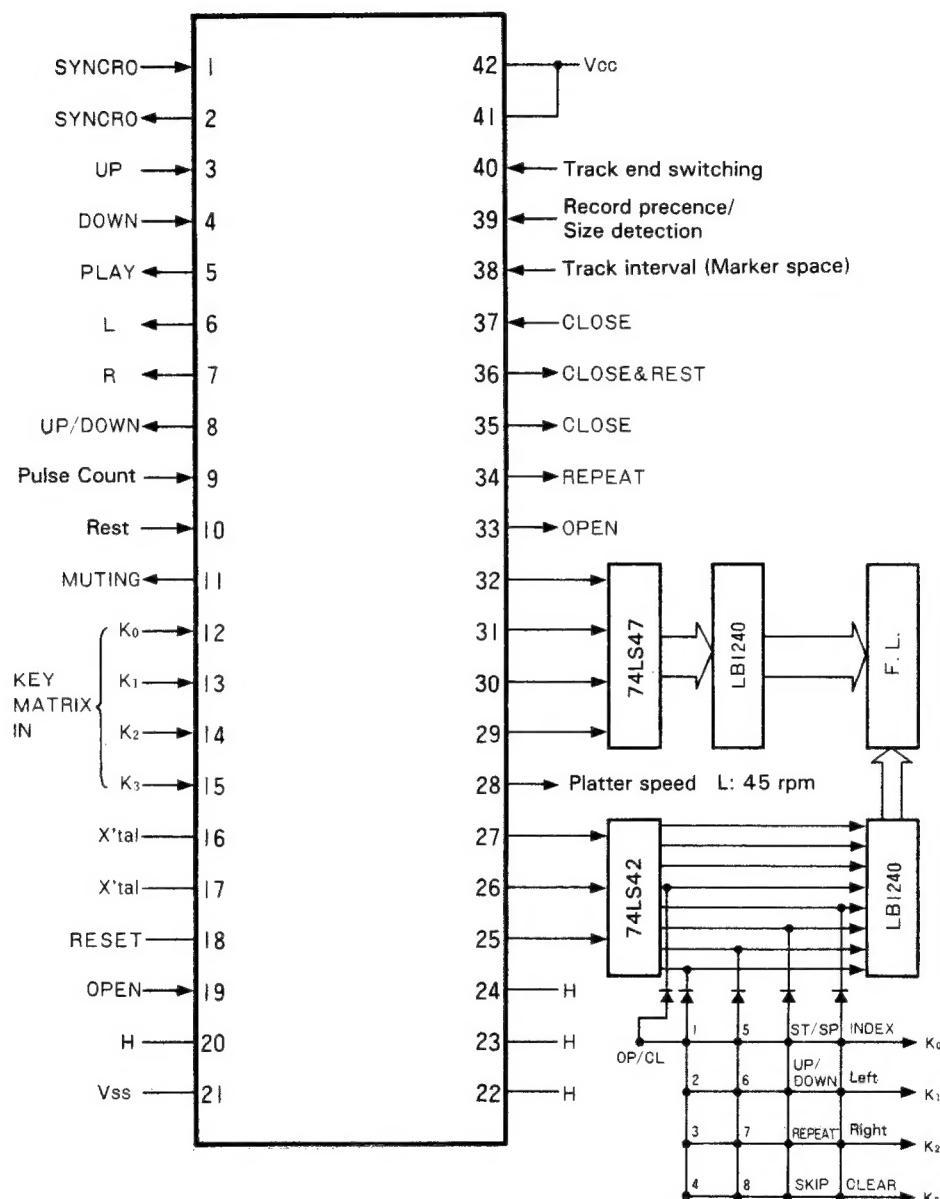


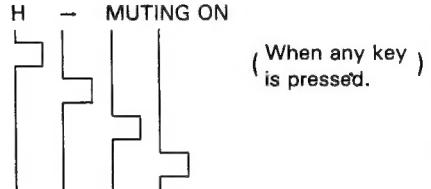
Fig. 2

| PIN No. | PORT NAME | INPUT/OUTPUT | COMMENT                                   |
|---------|-----------|--------------|-------------------------------------------|
| 1       | R4        | I            | DCS Input Terminal                        |
| 2       | R5        | O            | DCS Output Terminal                       |
| 3       | R6        | I            | UP Signal Input Terminal                  |
| 4       | R7        | I            | DOWN Input Terminal                       |
| 5       | R8        | O            | PLAY Signal Output Terminal               |
| 6       | R9        | O            | L Signal Output Terminal                  |
| 7       | R10       | O            | R Signal Output Terminal                  |
| 8       | R11       | O            | UP/DOWN Signal Output Terminal            |
| 9       | R12       | I            | PULSE COUNT Input (approx. 10 msec cycle) |
| 10      | R13       | I            | REST Signal Input Terminal                |
| 11      | R14       | O            | MUTING Output Terminal                    |
| 12      | K0        | I            | KEY MATRIX                                |
| 13      | K1        |              | INPUT                                     |
| 14      | K2        |              |                                           |
| 15      | K3        |              |                                           |
| 16      | EX        | I            | Microprocessor Clock Pulse Terminal       |
| 17      | X         |              | 4.19 MHz                                  |
| 18      | RESET     |              | Reset Terminal                            |
| 19      | IRQ       | I            | OPEN Input Terminal                       |
| 20      | TC        | —            |                                           |
| 21      | Vss       | Power Supply | OV                                        |
| 22      | SC/TO     | —            |                                           |
| 23      | Si        | —            |                                           |
| 24      | So        | —            |                                           |
| 25      | O0        | O            | BCD Output Terminal                       |
| 26      | O1        |              |                                           |
| 27      | O2        |              |                                           |
| 28      | O3        | O            | 33/45 Output Terminal                     |
| 29      | O4        | O            |                                           |
| 30      | O5        |              | 7-Segment Output Terminal                 |
| 31      | O6        |              |                                           |
| 32      | O7        |              |                                           |
| 33      | P0        | O            | CLOSE Output Terminal                     |
| 34      | P1        | O            | REPEAT Output Terminal                    |
| 35      | P2        | O            | OPEN Output Terminal                      |
| 36      | P3        | O            | CLOSE & REST Output Terminal              |
| 37      | R0        | I            | CLOSE Input Terminal                      |
| 38      | R1        | I            | Track Interval Input Terminal             |
| 39      | R2        | I            | Record Presence & Size Detection          |
| 40      | R3        | I            | PULSE COUNT switching                     |
| 41      | VM        | Power Supply |                                           |
| 42      | Vcc       |              | 5V                                        |

H ← UP  
H ← DOWN  
L ← PLAY  
L ← L  
L ← R  
H ← UP

(during arm movement)

H ← REST  
H ← MUTING ON



(When any key is pressed.)

4.19 MHz

L ← During RESET

H ← OPEN

H

L

H

H

H

H → 33

L ← CLOSE

L ← REPEAT · ON

L ← OPEN

L ← CLOSE & REST

L ← CLOSE

H ← Track Interval

H ← 17 cm (30 cm circumference)

H ← None (on PLATTER MAT)

L ← 0

H ← -3

## 6. Stylus Replacement

### 6-(1) Removal

Pull out the stylus assembly steadily in direction of the arrow, as shown in the illustration. Do not pull the assembly forward or at an angle to the cut-out.

**Note:** Stylus replacement is facilitated by removing the cartridge first.

### 6-(2) Attachment

Fit the protruding section of the stylus assembly into the cut-out on the cartridge and slide the assembly smoothly in, as shown in the illustration. Do not slide at an angle to the cut-out.

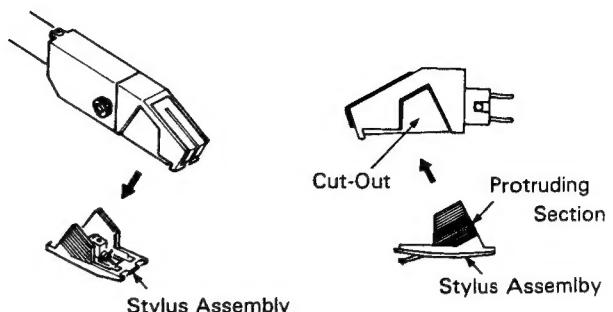


Fig. 3

## 7. Cartridge Replacement

This unit is designed for use with T4P plug-in type cartridges. Cartridge replacement with another cartridge of this type is possible. For replacement, loosen the fastening screw of the cartridge and pull the cartridge out, as shown in the illustration.

**Note:** Be sure to use the cartridge fastening screw of this unit even with another cartridge, in order to ensure correct tracking force.

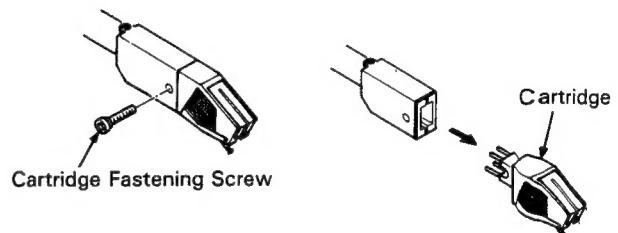


Fig. 4

# 8. Disassembly

## 8-(1) Disassembly Procedure

### 1. Removal of metal cover

Remove the four screws on both sides of the unit and the five screws on the rear panel of the unit, and pull the cover straight up while slightly spreading it.

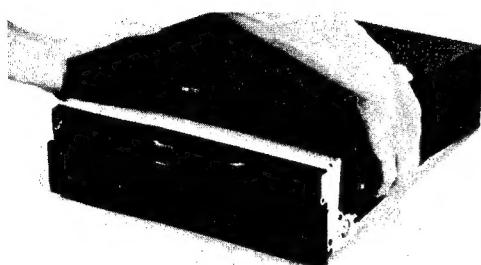


Fig. 5

### 3. Removal of main drive motor

Take off the platter and loosen the four screws shown in the illustration. Lift the cabinet up.

**Note:** Be careful not to disturb the cartridge stylus or the sockets and wires on the PCB.

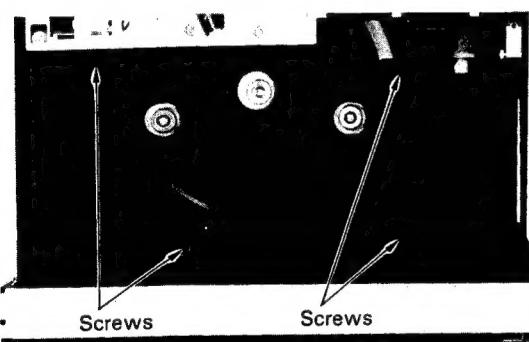


Fig. 9

Removal screws ① ~ ④ shown in Fig. 10, and remove the motor.

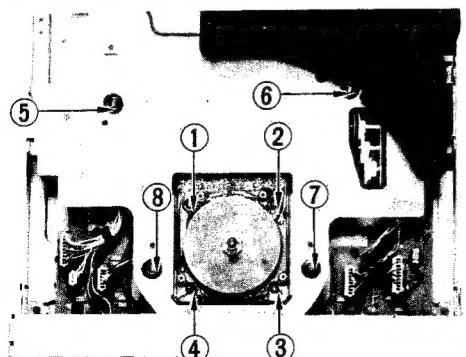


Fig. 10

### 2. Removal of mechanism base ass'y

Remove the five screws (on both sides and upper) of the unit shown in the illustration, and unhook the wire in the rear from its clamp to loosen it. Then pull the base straight up.

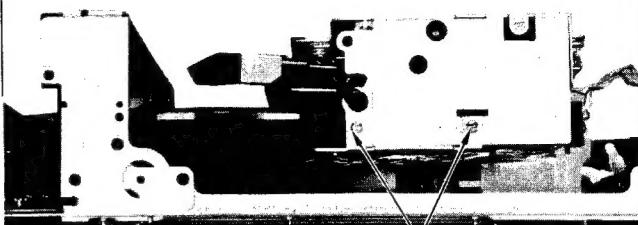


Fig. 6

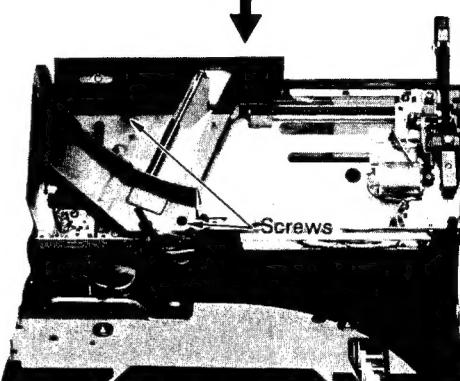


Fig. 7

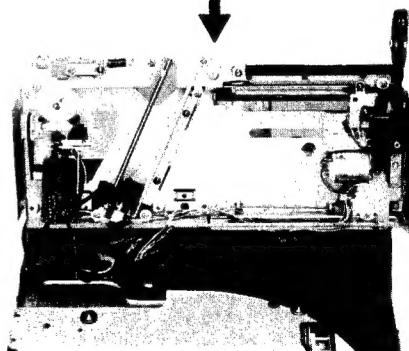


Fig. 8

### 4. Removal of Loading Drive Motor

Remove screws ⑤ ~ ⑧ shown in Fig. 10, and remove the turntable board.

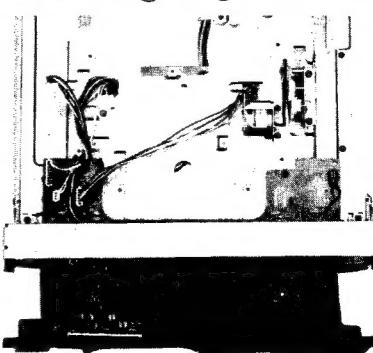


Fig. 11

## 8-(2) Removal and Attachment of Platter Compartment Door

1. Remove screws ① and ② shown in the illustration, and pull out the cam to remove the door.

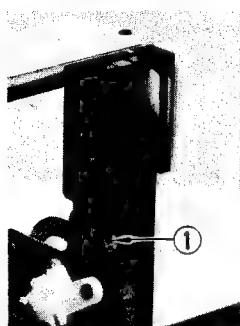


Fig. 12

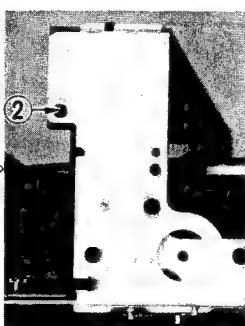


Fig. 13

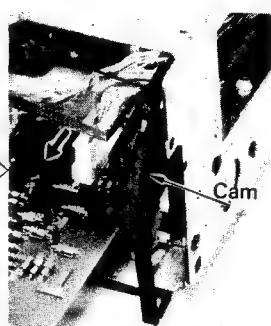


Fig. 14

2. To attach the door, reverse the procedure. Push the door lever by hand and insert the projection A into the slot.

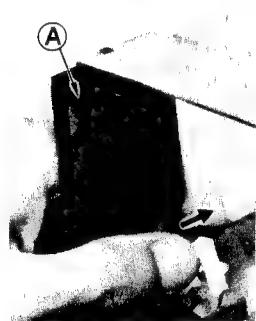


Fig. 15

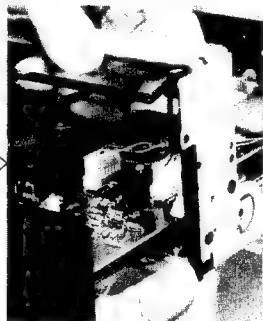


Fig. 16

## 9. Rope Suspension

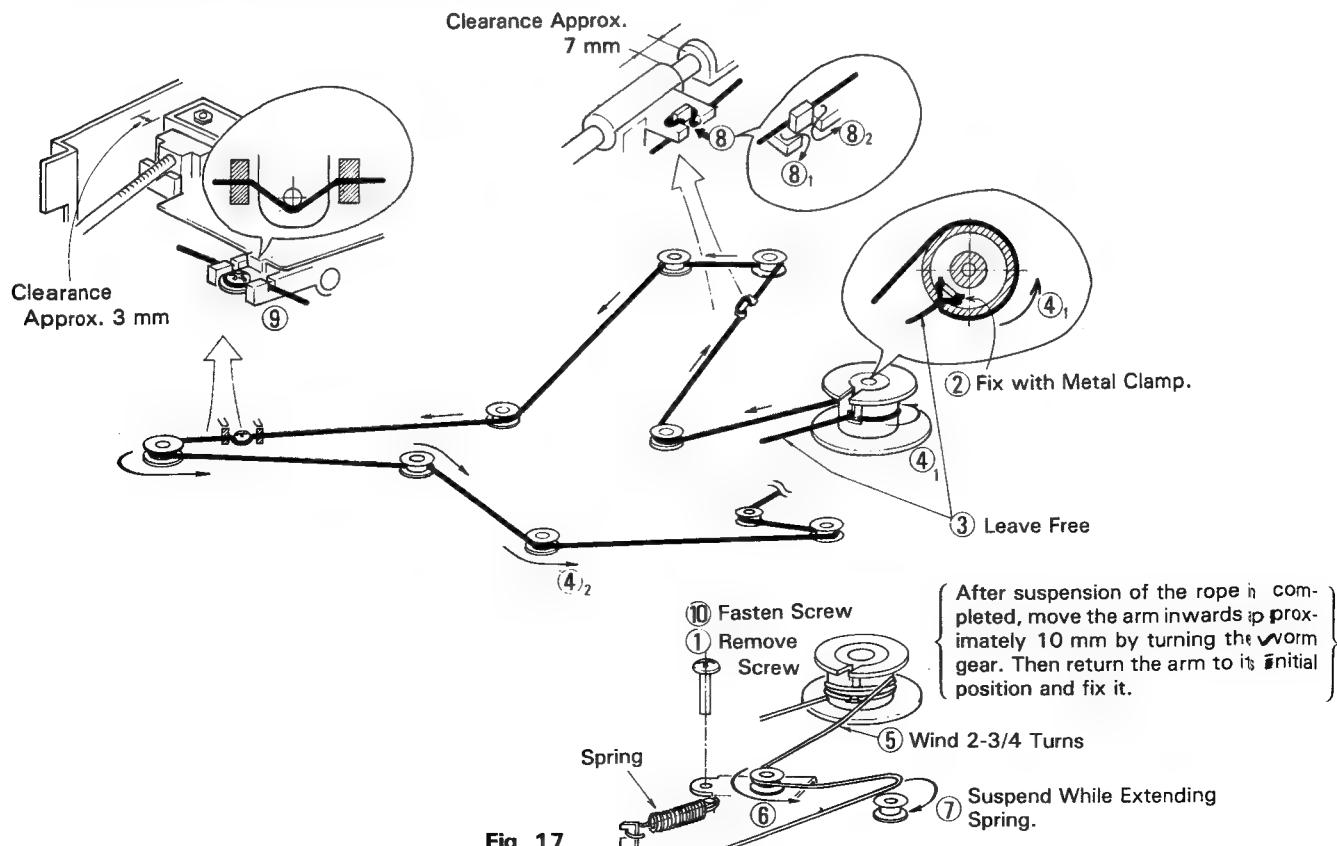
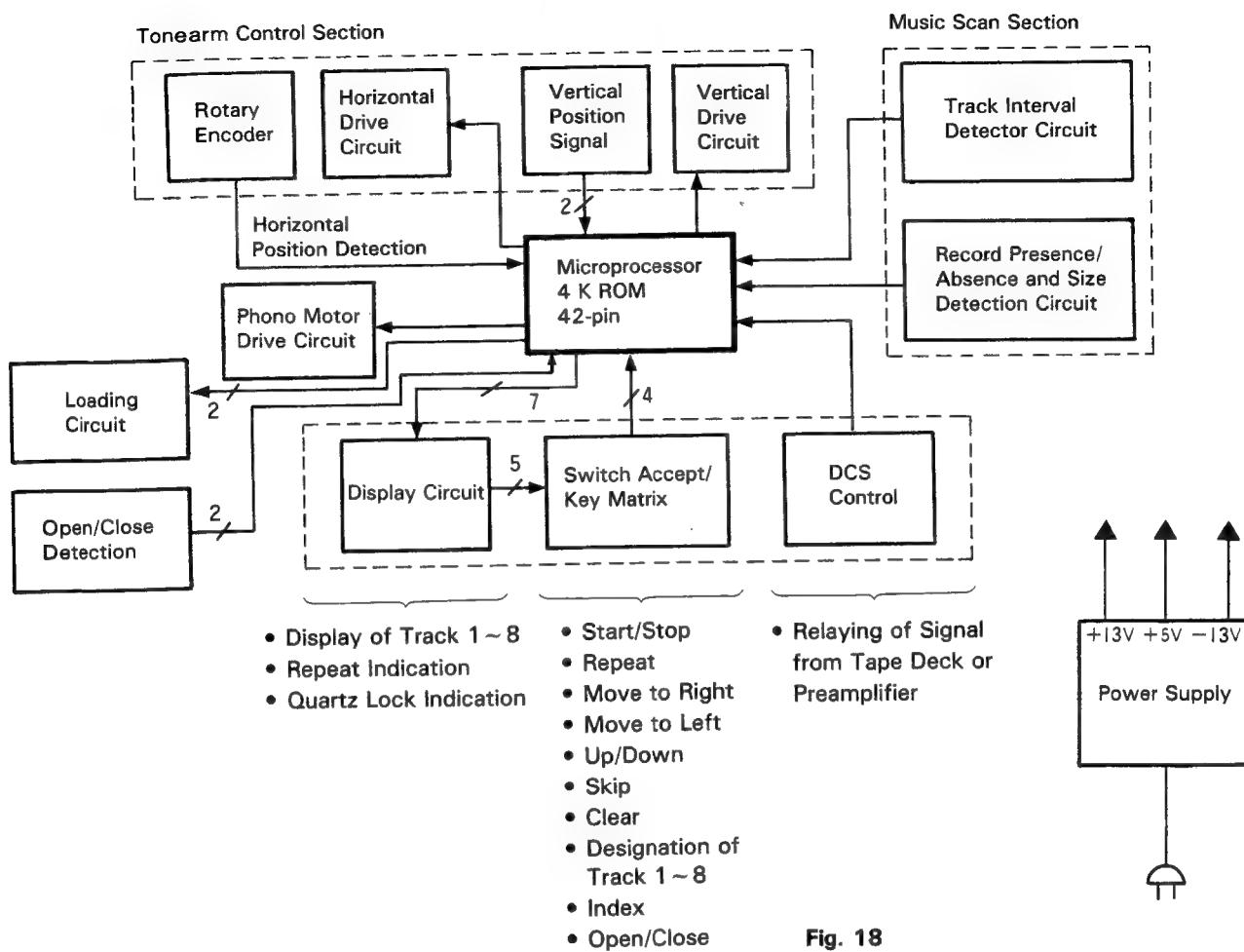


Fig. 17

## 10. Block Diagram



## 11. Check of Power Supply P.C. Board

To check the power supply circuit and logic circuit in the playback mode, the loading mechanism must be in the open condition.

- To open the loading mechanism, short-circuit pin 3 and pin 4 of P903.

1. Remove the platter and cabinet.  
(Refer to "Disassembly", step 3)
2. Set the loading mechanism to the open condition.
3. Re-install the platter and switch on the power.

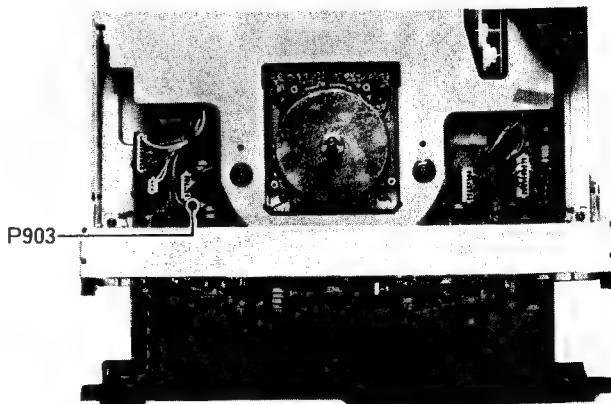
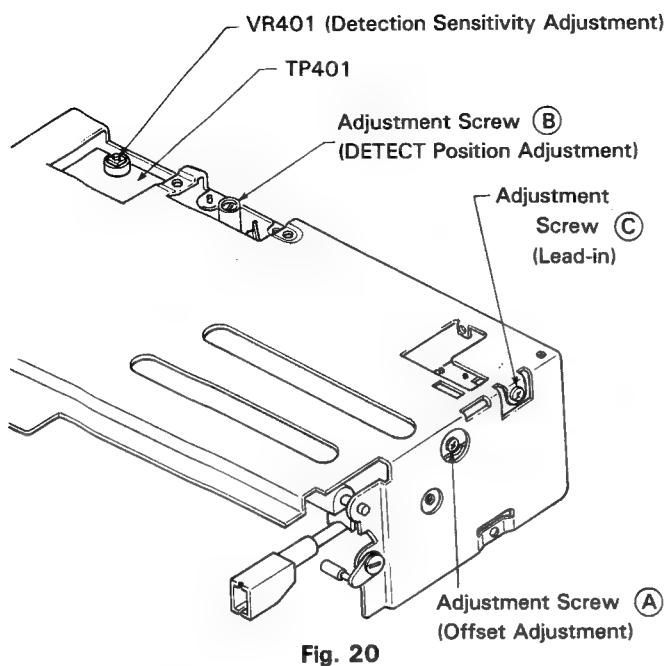


Fig. 19

# 12. Adjustment Procedures



## 12-(1) Lead-In Adjustment

Adjust the adjustment screw **C** for a lead-in count of  $23 \pm 2$  for 30-cm records. Check also the lead-out position for 17-cm records.

|                | Test Record | Count      | —          |
|----------------|-------------|------------|------------|
| 30-cm Lead-In  | RG325       | $23 \pm 2$ | Adjustment |
| 17-cm Lead-In  | SS-4445     | $23 \pm 5$ | Check      |
| 17-cm Lead-Out | SS-4445     | $26 \pm 4$ | Check      |

## 12-(2) Offset Adjustment

1. Connect TP203 to ground via a  $2.2k\Omega$  resistor, as shown in Fig. 21.
2. Set the tonearm to the UP position.
3. Adjust screw **A** to obtain a voltage of  $85 \pm 5$  mV between TP201 and TP202.

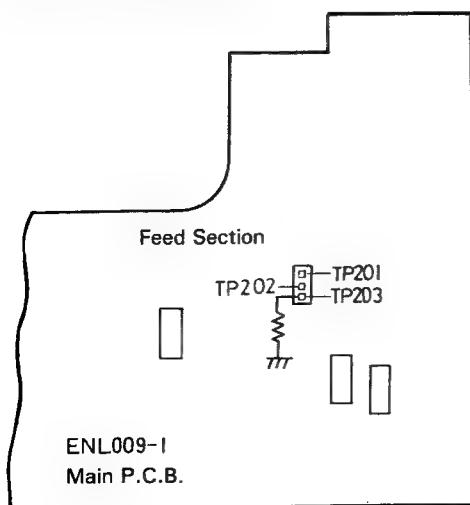


Fig. 21

## 12-(3) Track Interval (Marker Space) Detection Sensor Sensitivity Adjustment

1. Move the sensor to a position above the reflective ring on the inner circumference of the platter mat by the "<" button.
2. Adjust VR401 to obtain a voltage of  $2.1 V \pm 0.05 V$  between TP401 and ground (0 V).

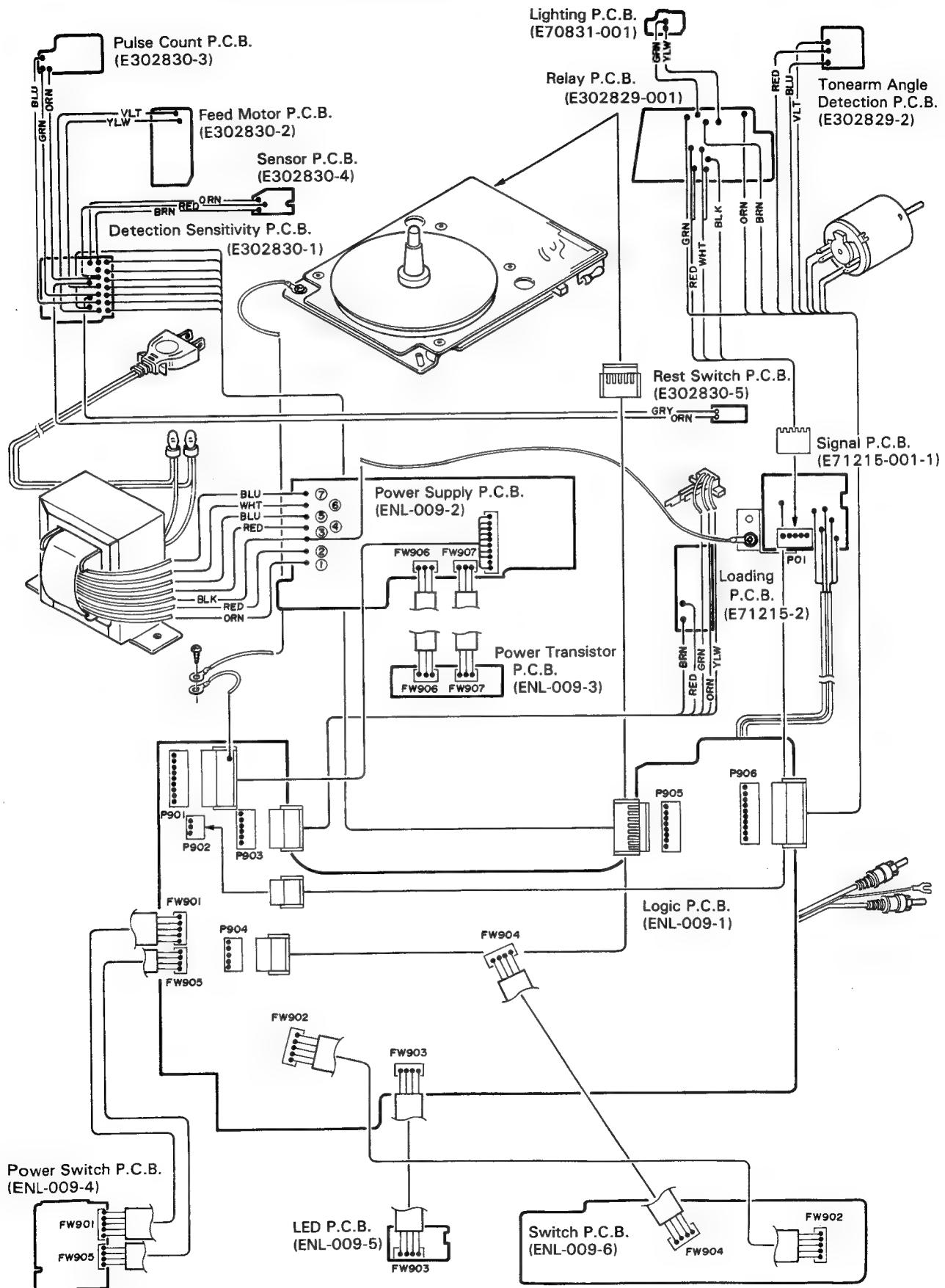
**Note:** As the sensor sensitivity is strongly influenced by external light, reduce ambient lighting as much as possible when performing this adjustment.

## 12-(4) Detect Position (Touch-Down Position) Adjustment

Turn the adjustment screw **B** to the left ( $\leftarrow$ ) or right ( $\rightarrow$ ).

- Note:**
- Correct position adjustment will be possible within about one revolution of the screw. Do not turn the screw excessively.
  - After adjusting screw **B**, slide the platter out and in again, cause the tonearm to perform search, and then check the touch-down position. If the search operation is not performed, the touch-down position will not change even if the adjustment screw was turned.

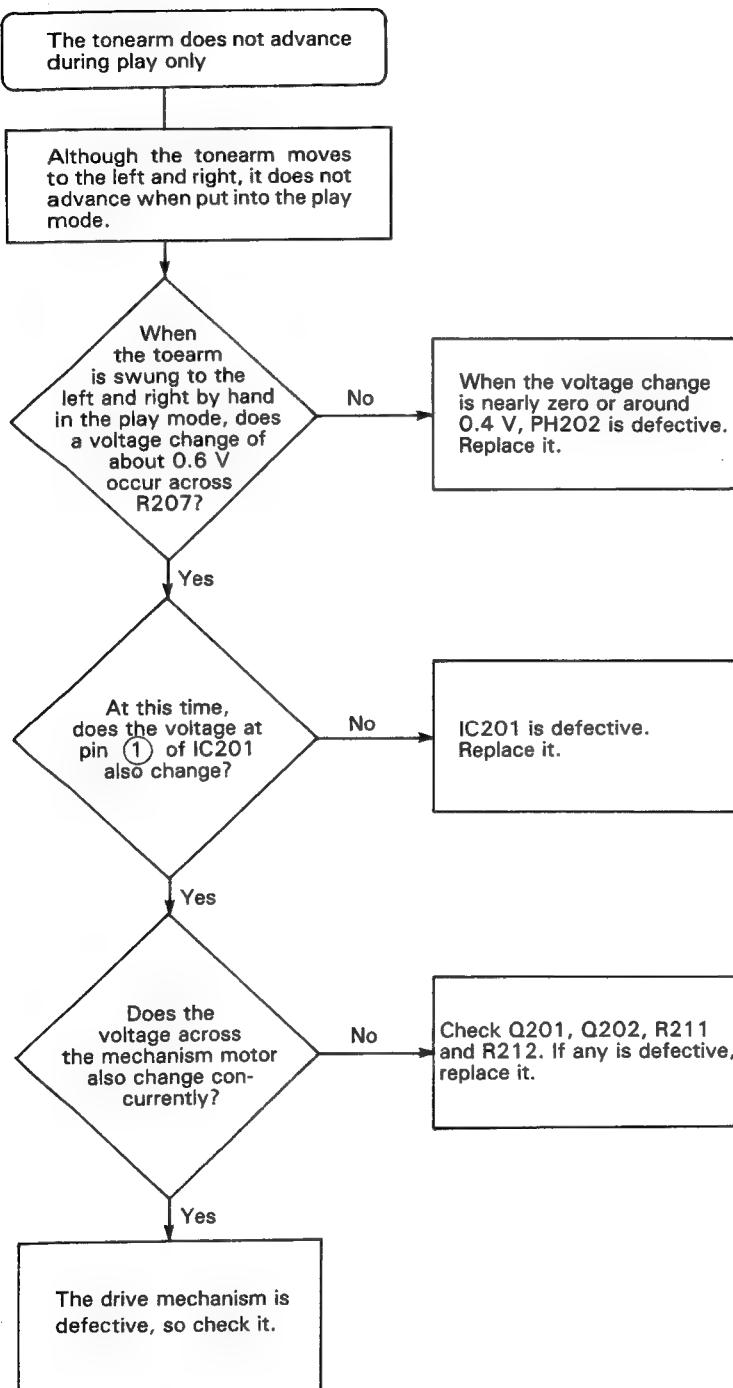
## 13. Connection Diagram

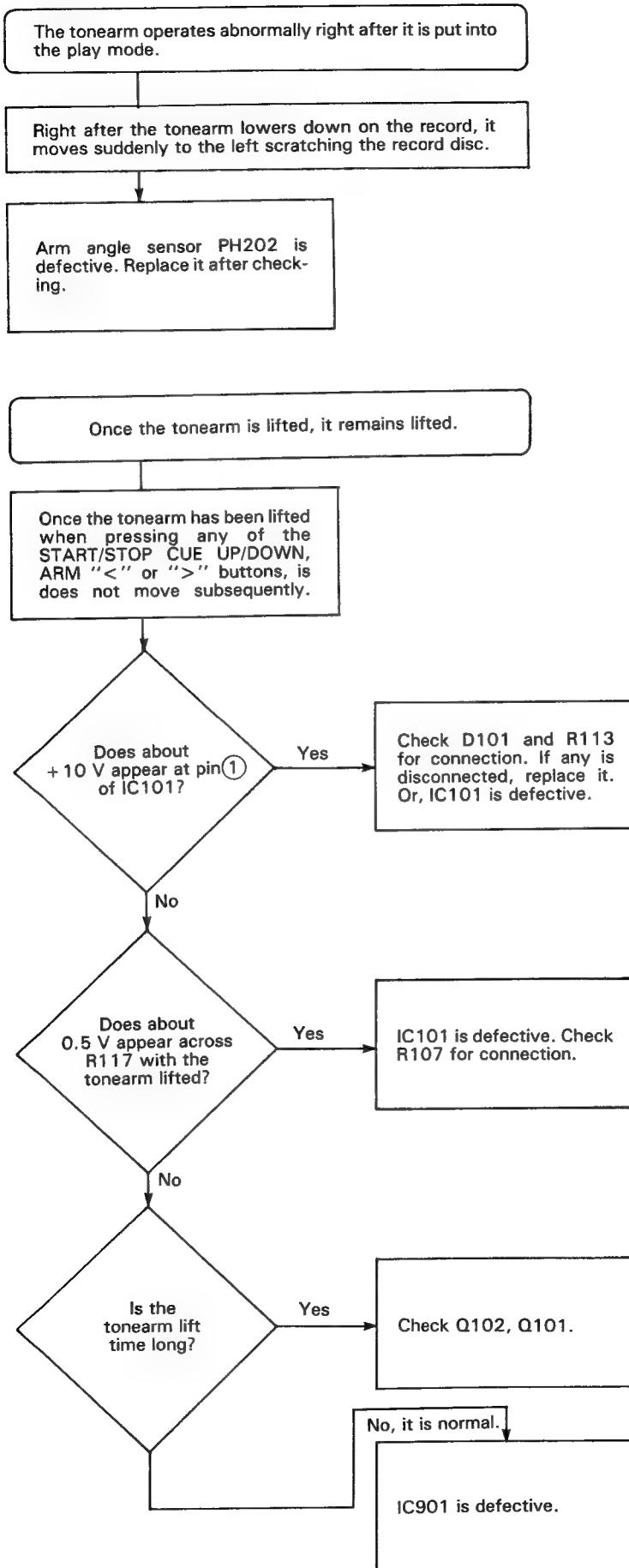


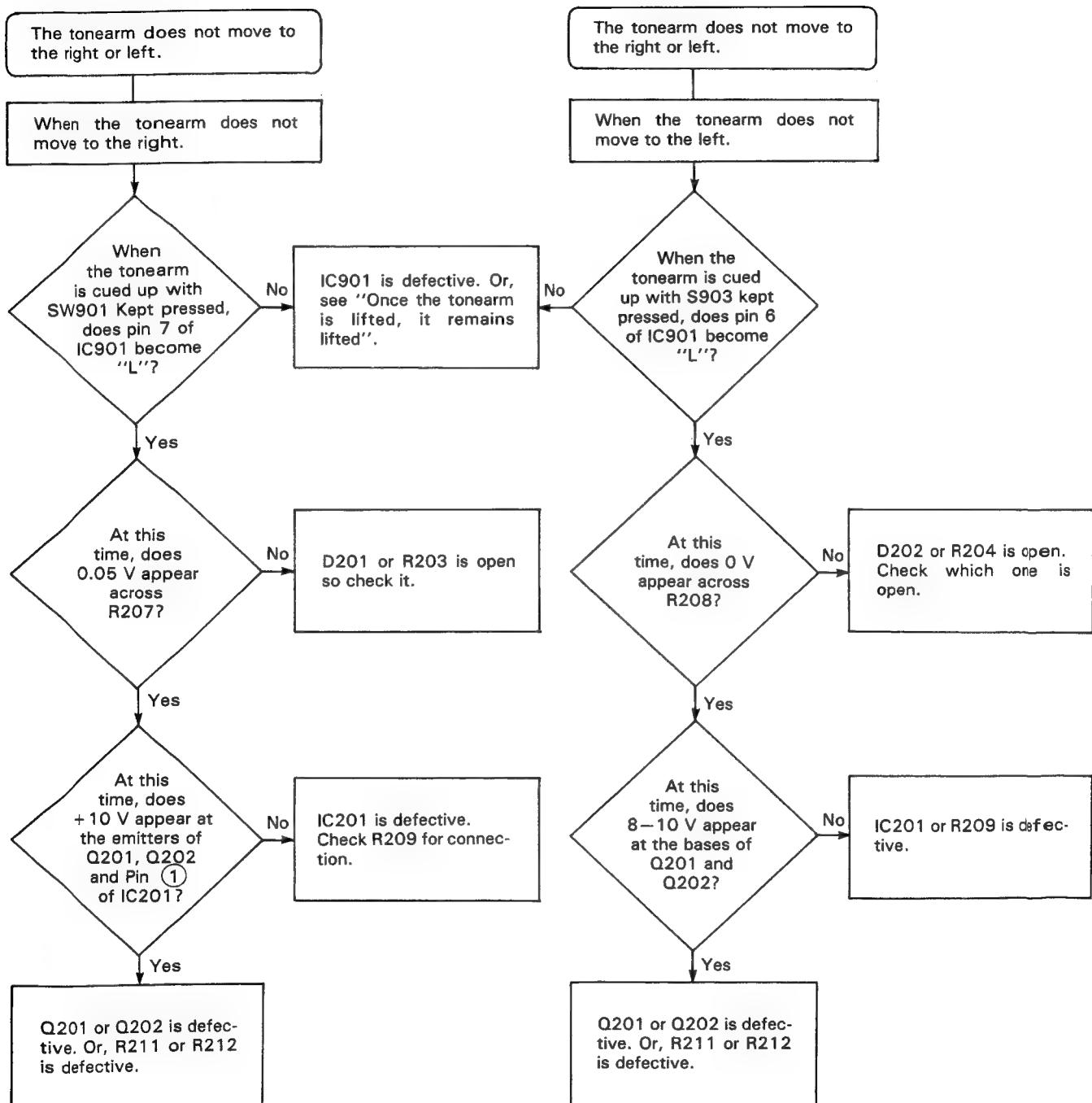
**Fig. 22**

# 14. Troubleshooting

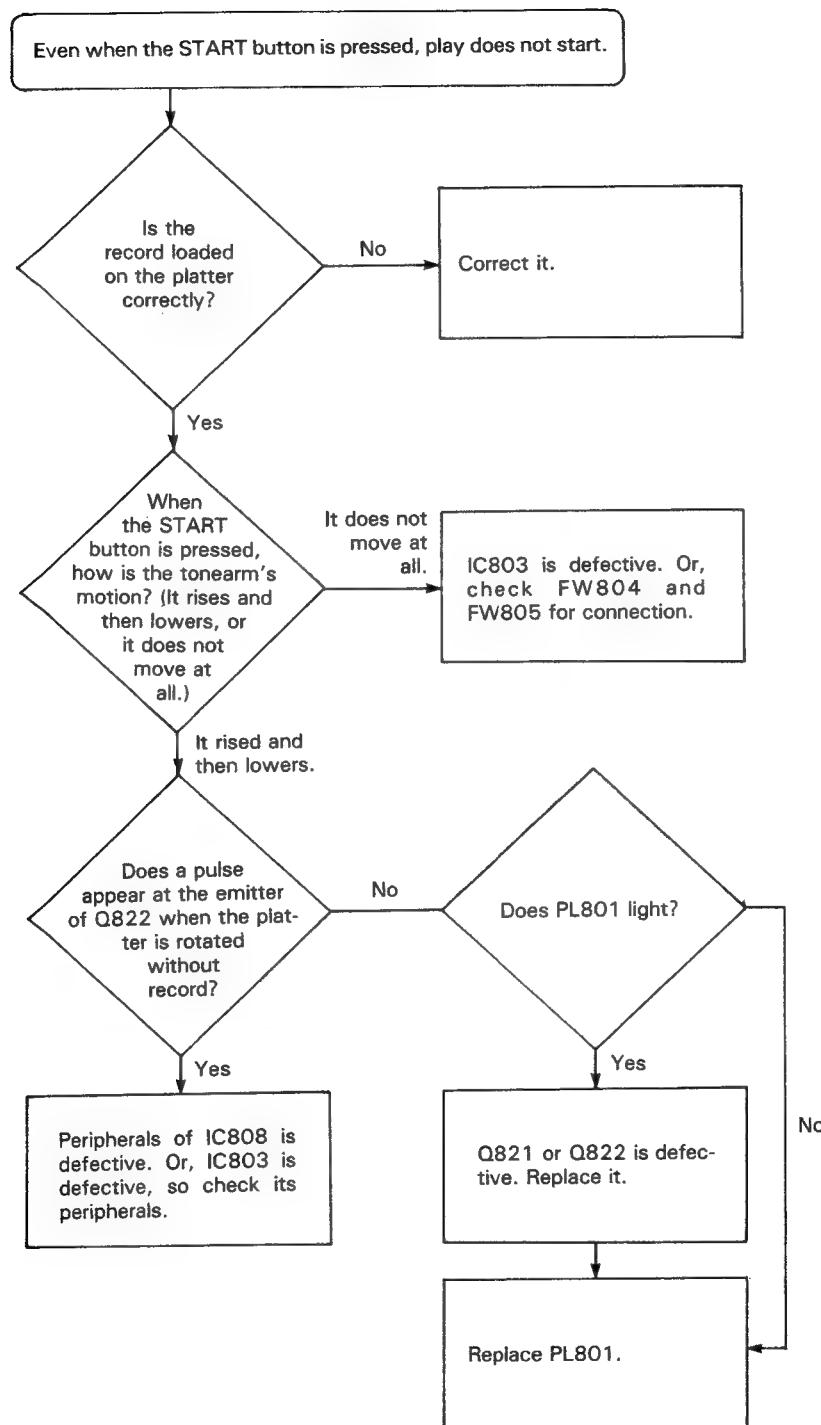
## 14-(1) When Tonearm Action is Abnormal

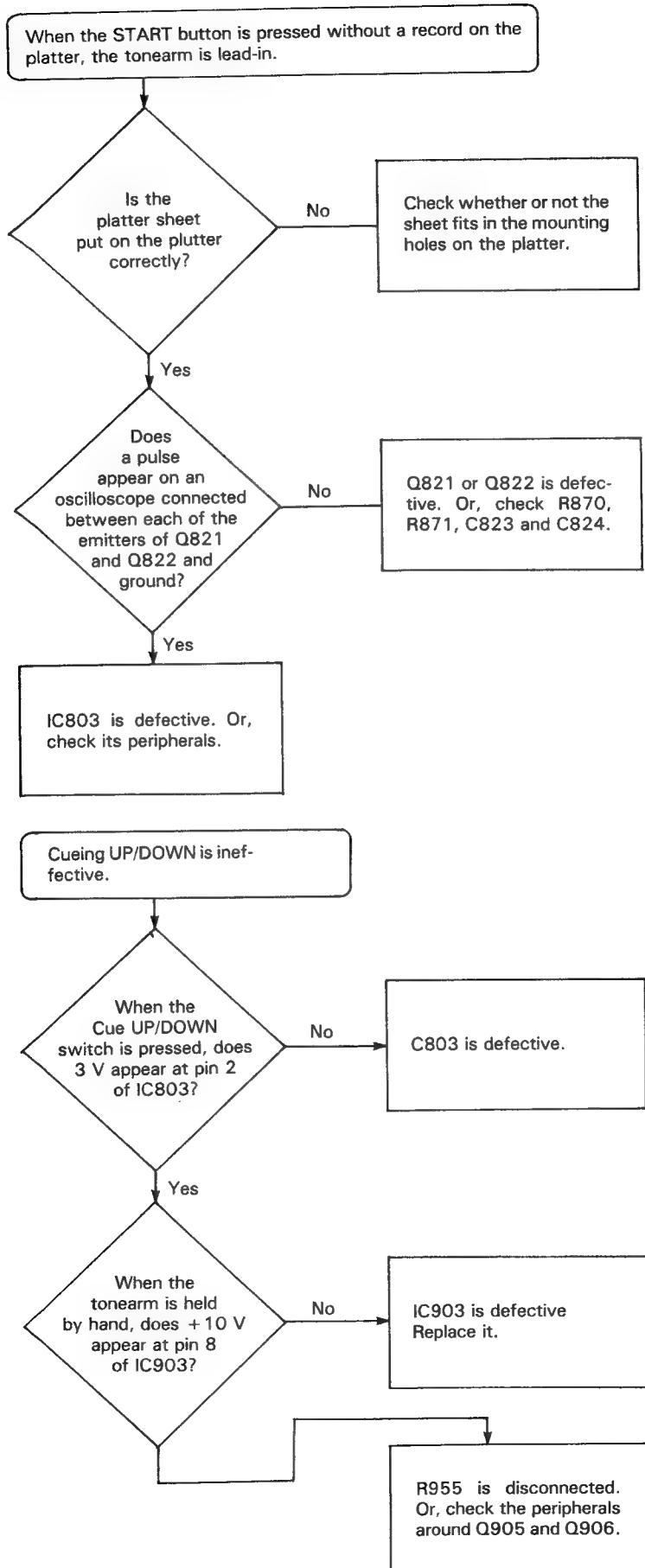


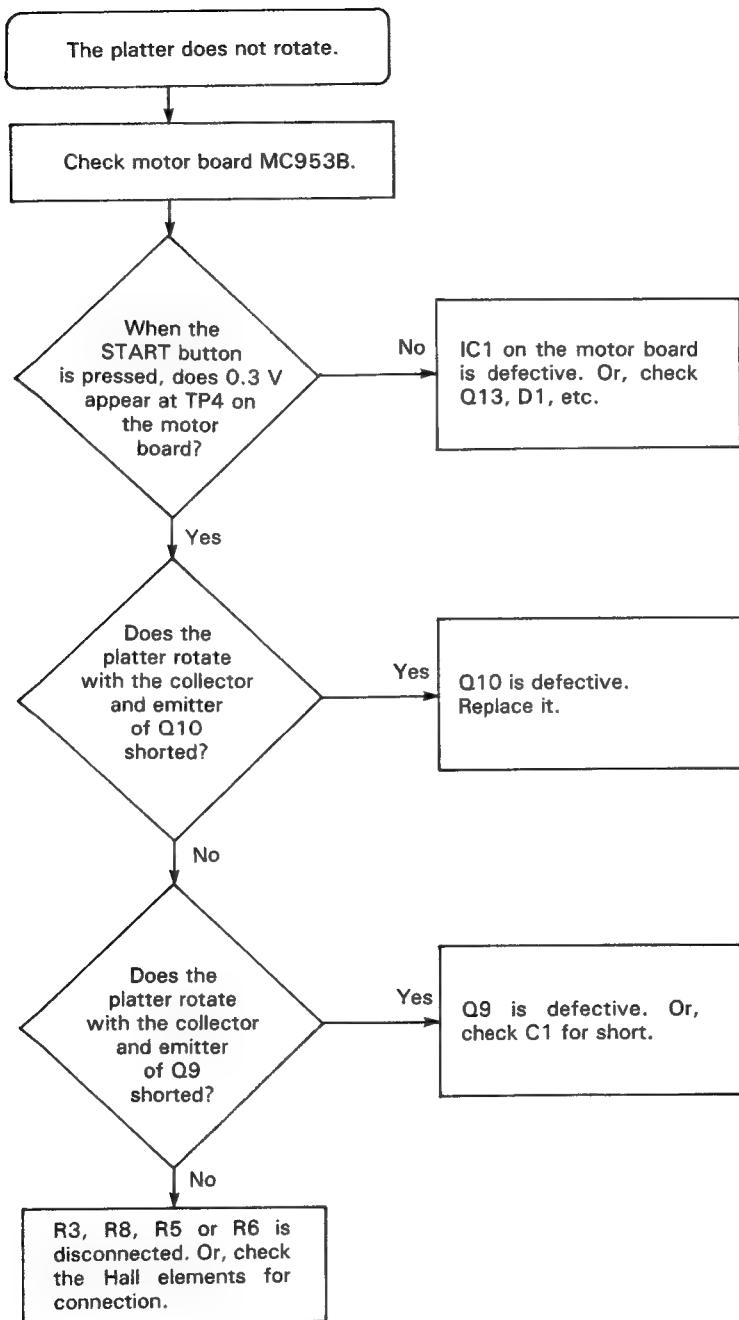


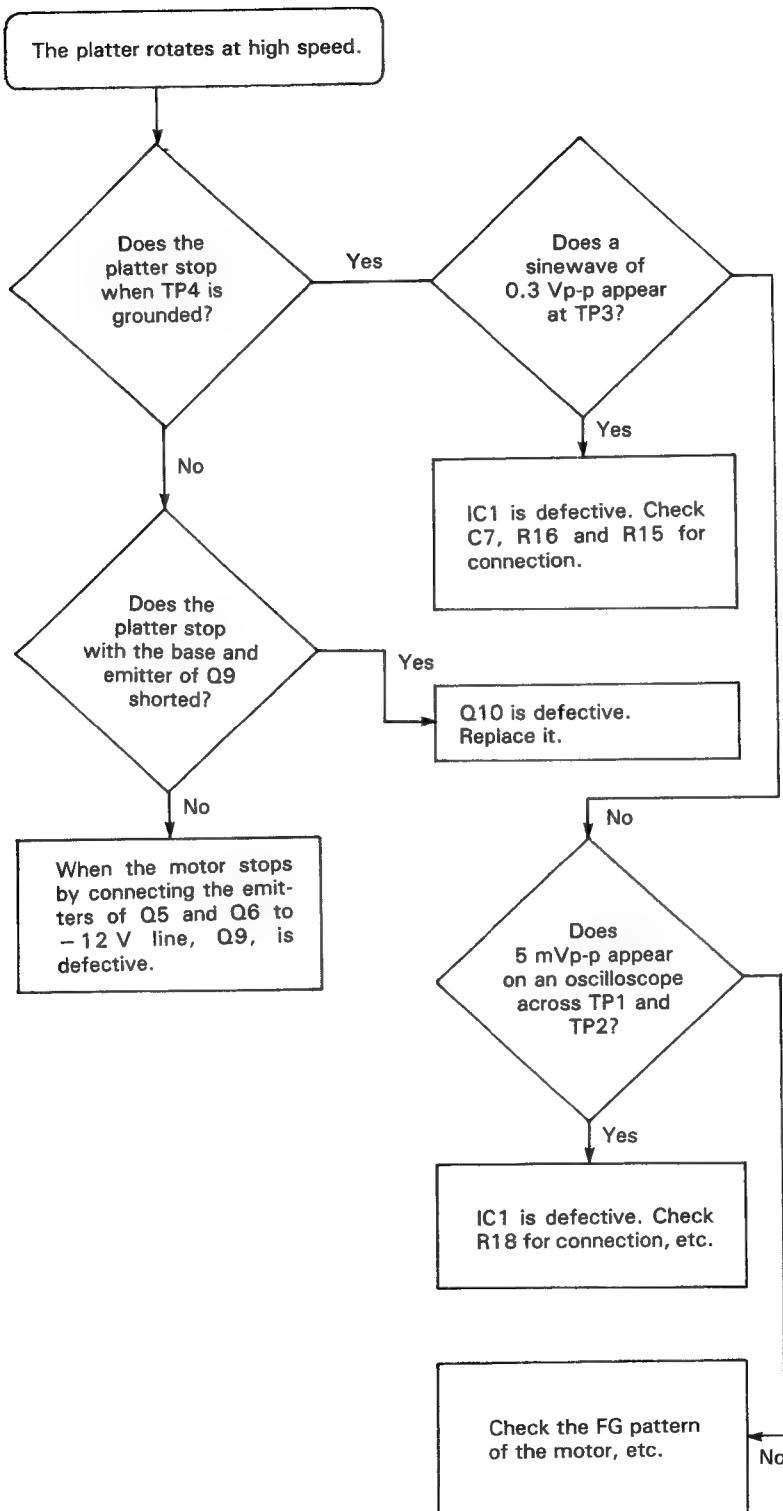


## 14-(2) When Turntable Operation is Abnormal

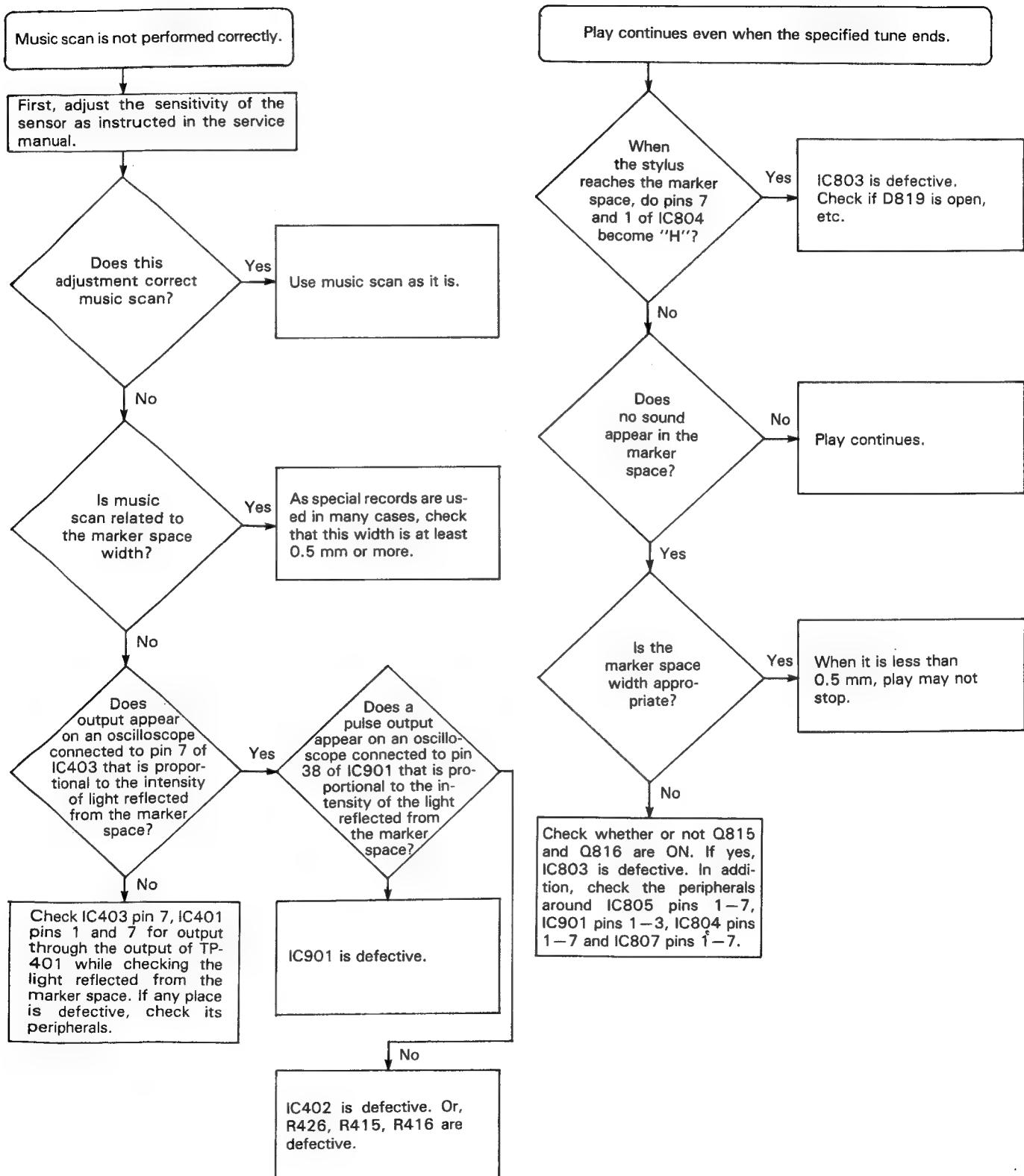








### 14-(3) When Music Scan Operation is Abnormal



## 15. Standard Circuit Diagram

1 2 3 4 5 6 7 8 9 10

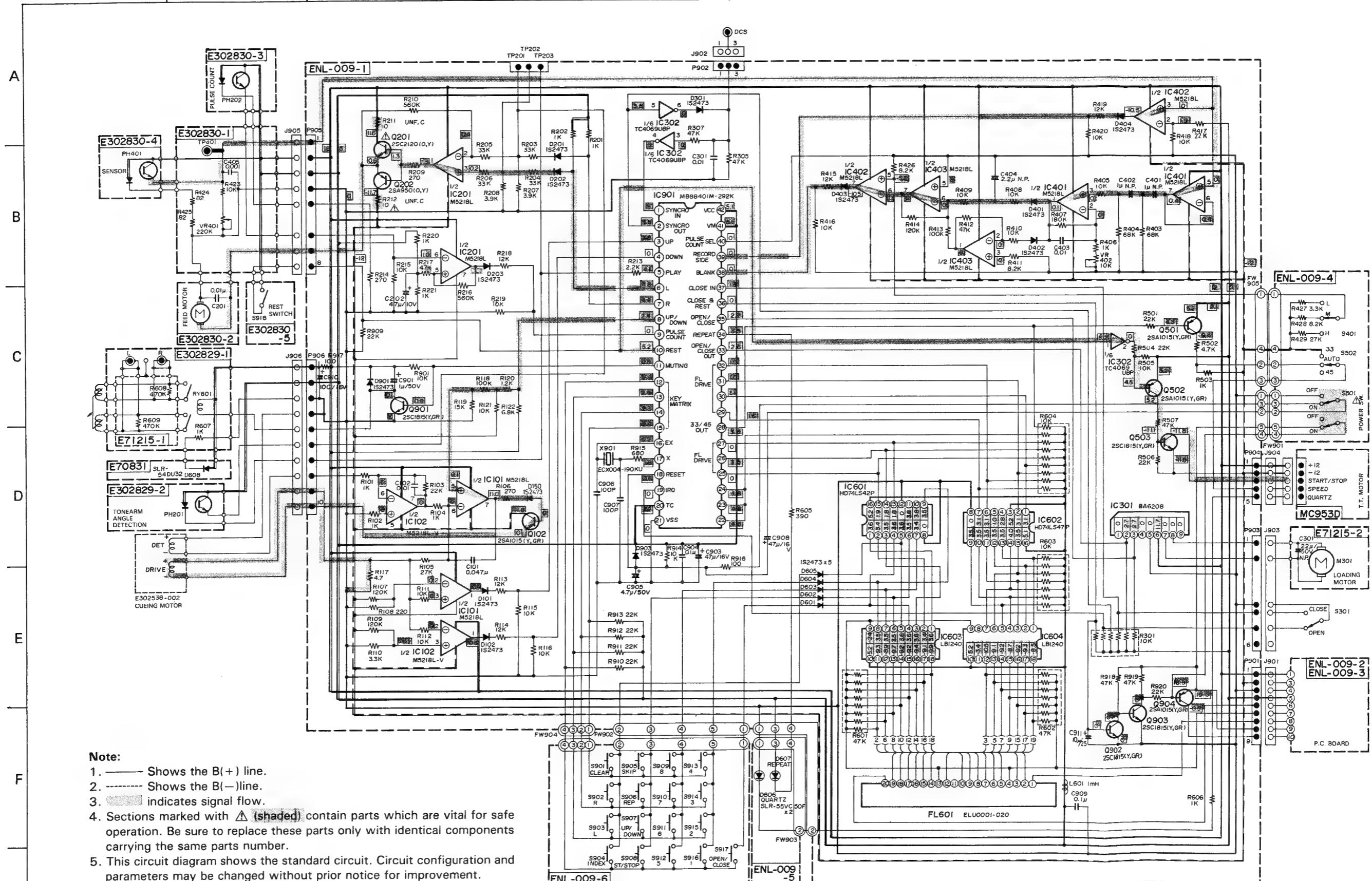
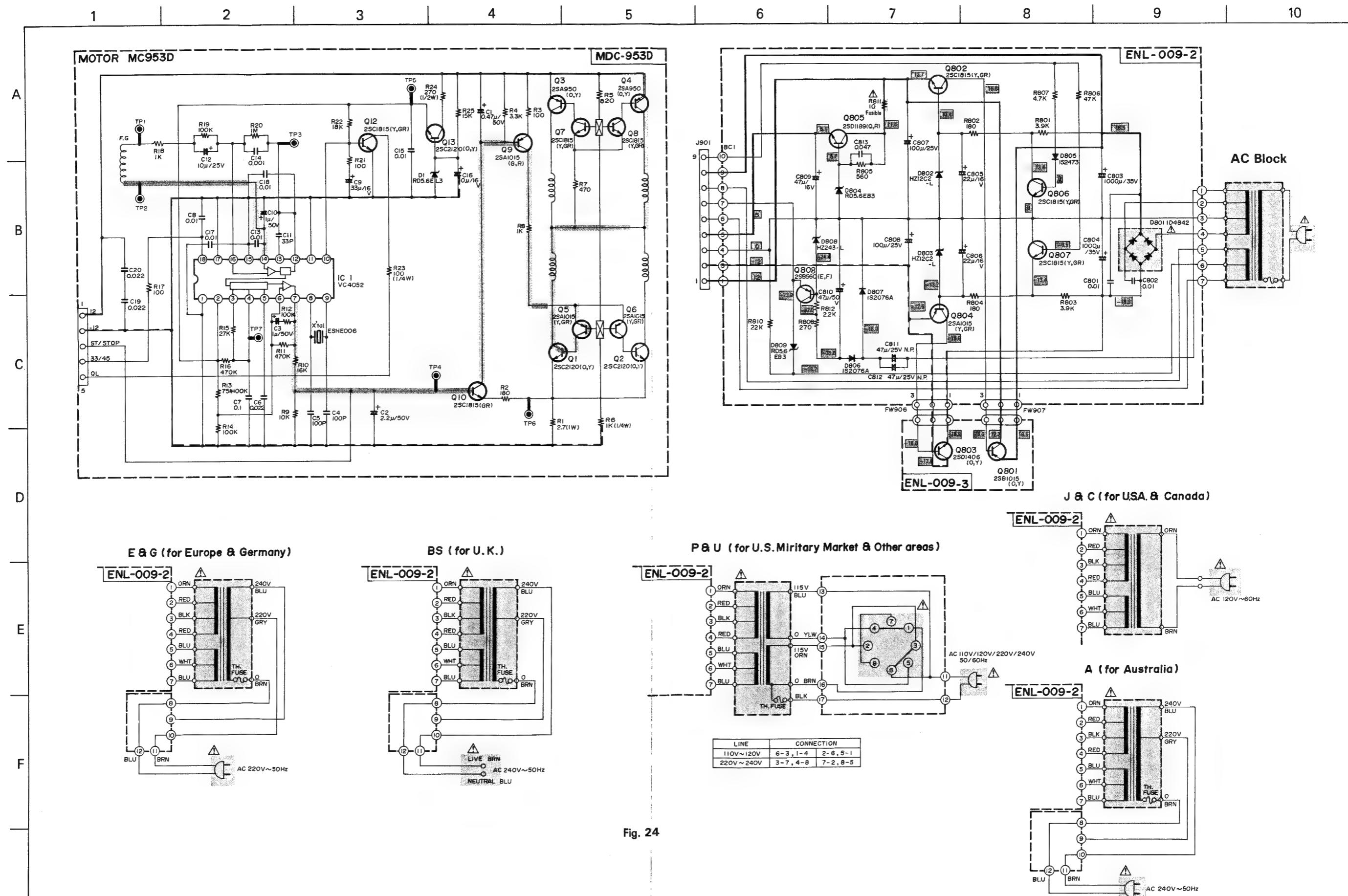


Fig. 23



**Fig. 2**

# PARTS LIST

## Contents

|                                                    |      |
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# Main Parts Location

## Front View

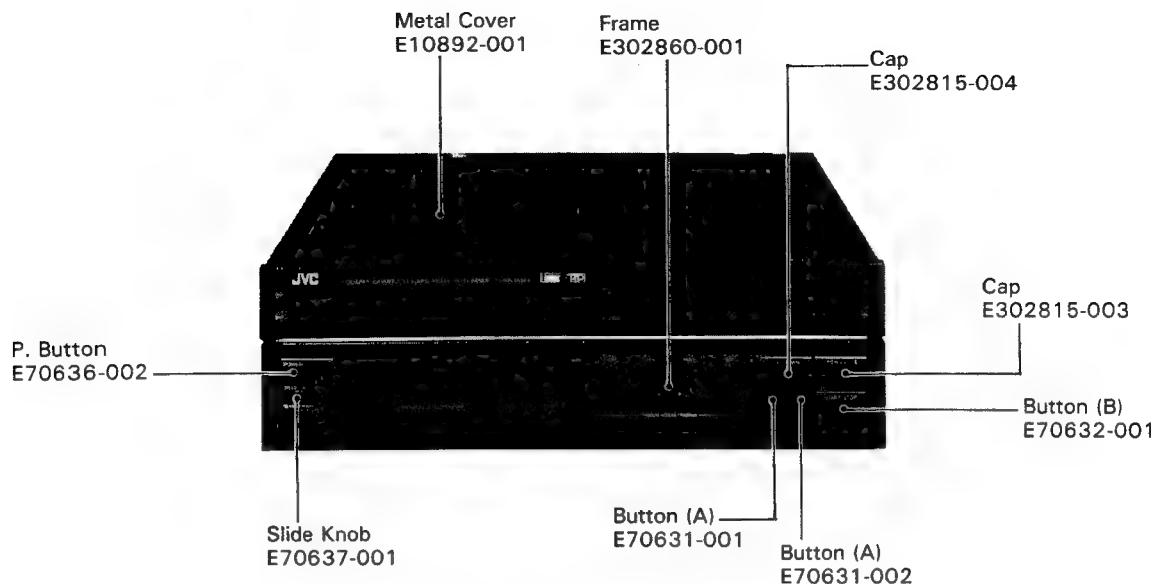


Fig. 1

## Top View

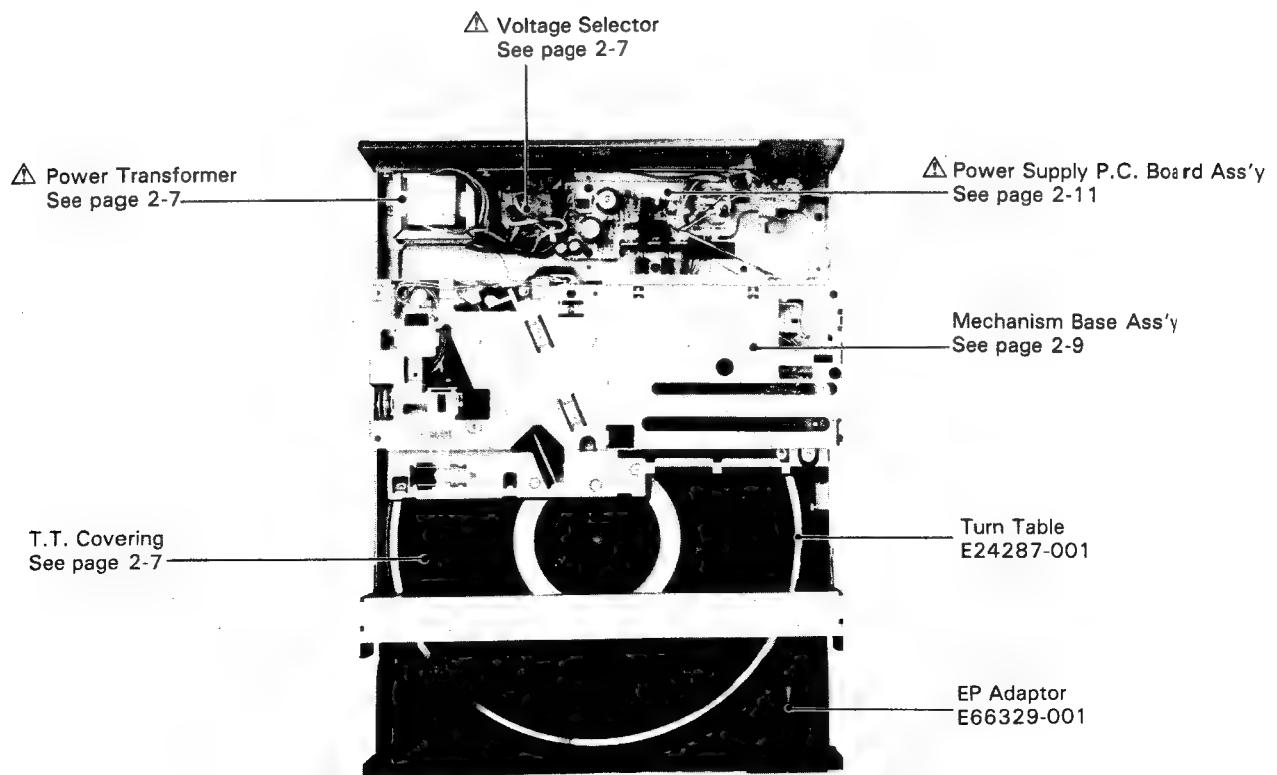
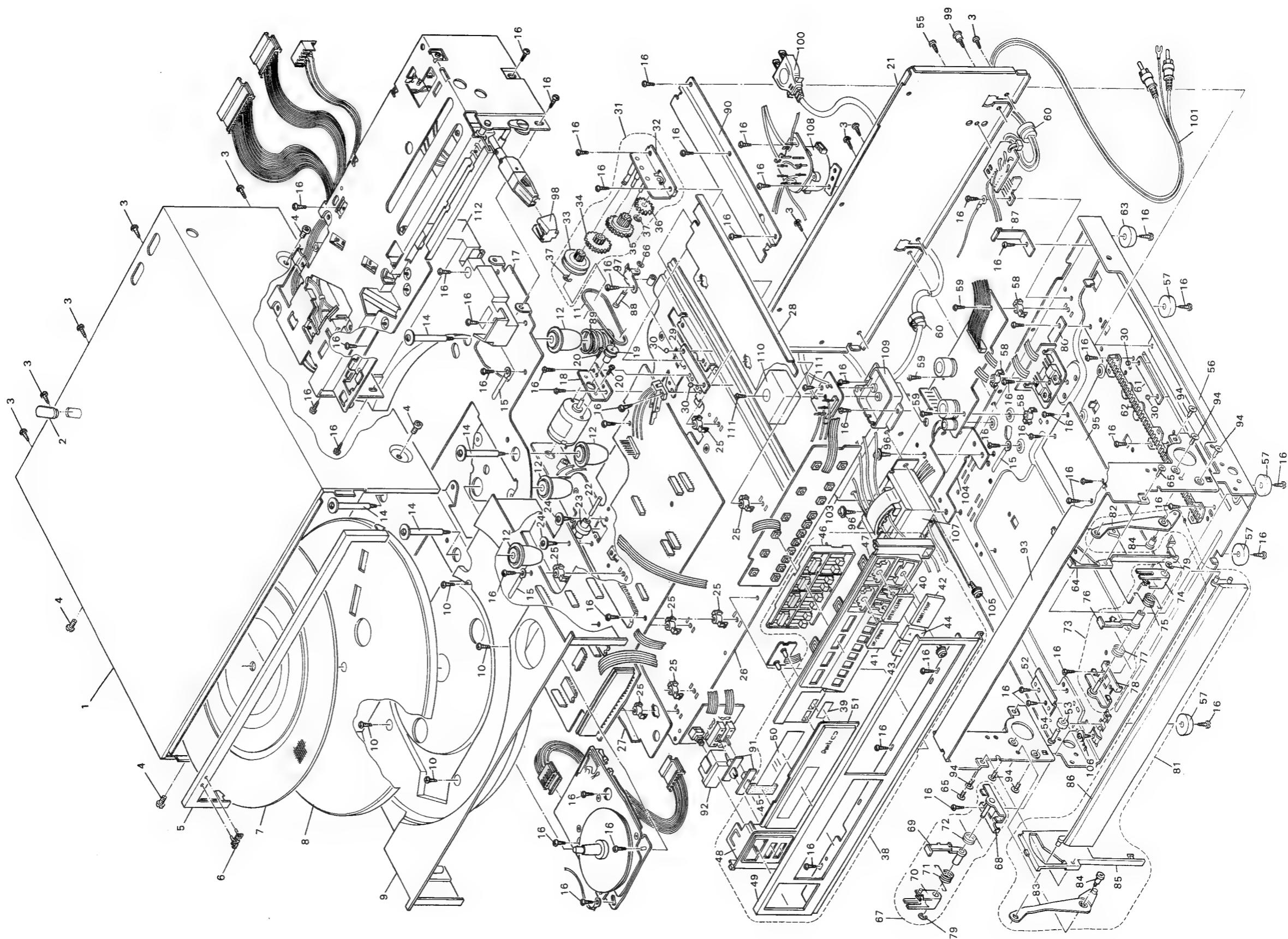


Fig. 2

⚠ : Safety Parts

## Exploded View and Part Numbers



■ U.S.A. and Canada only

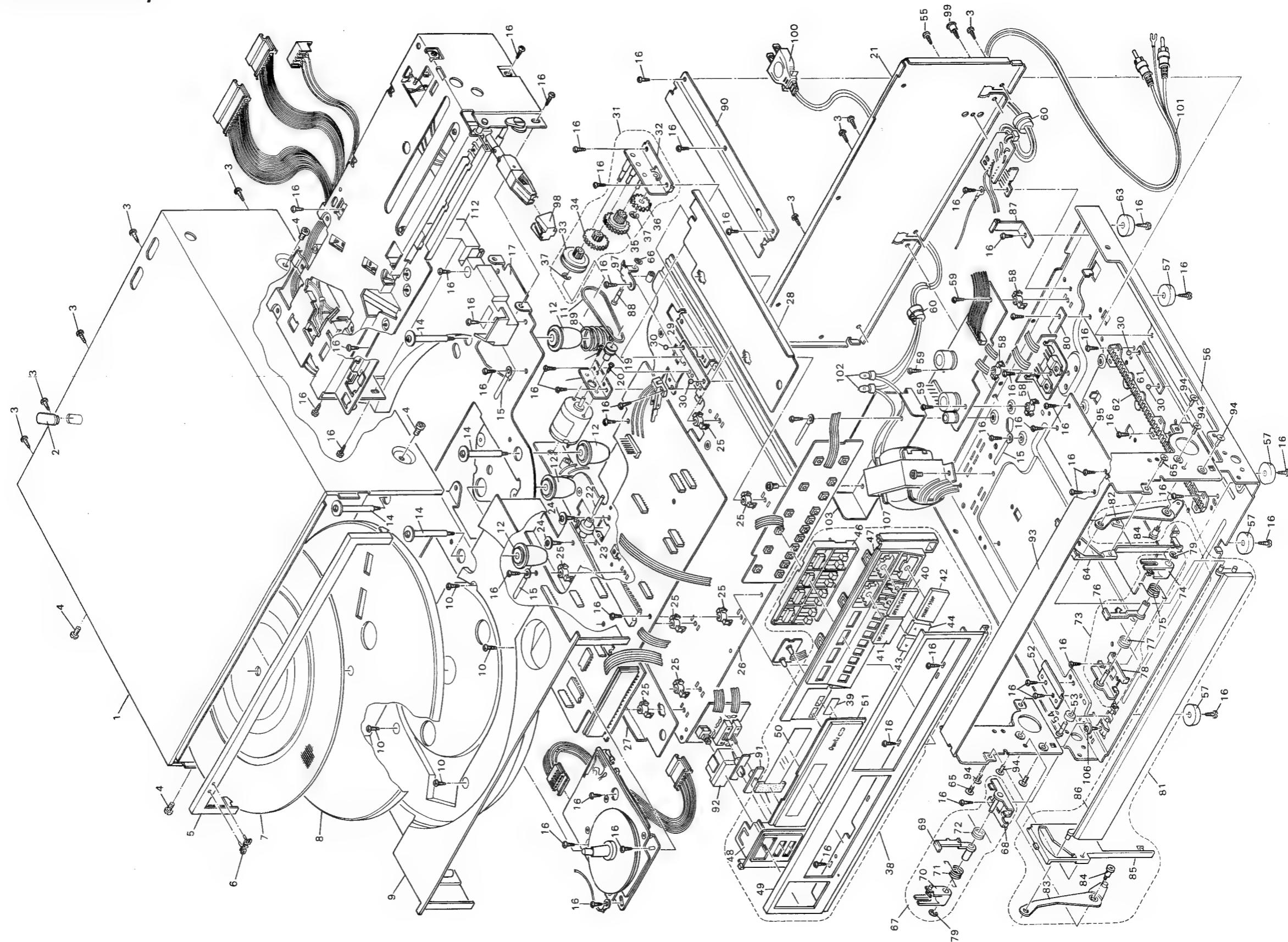


Fig. 4

**The Marks for Designated Areas.**

|          |              |            |                     |
|----------|--------------|------------|---------------------|
| J .....  | U.S.A.       | A .....    | Australia           |
| C .....  | Canada       | P,PG ..... | U.S.Military Market |
| E .....  | Europe       | BS .....   | U.K.                |
| G .....  | West Germany | U .....    | Other Countries     |
| ES ..... | Spain        |            |                     |

No mark indicates all areas.

| No. | Part Number   | Part Name           | Q'ty | Description | Area |
|-----|---------------|---------------------|------|-------------|------|
| 1   | E10892-001    | Top Cover           | 1    |             |      |
| 2   | E71090-001    | Cap                 | 2    | Sensor      |      |
| 3   | SBSB3006M     | Tapping Screw       | 9    |             |      |
| 4   | E61660-004    | Special Screw       | 4    | Side        |      |
| 5   | E24487-001    | Door Cover          | 1    |             |      |
| 6   | E70912-001    | JVC Mark            | 1    |             |      |
| 7   | E302859-001   | T.T. Covering Ass'y | 1    |             |      |
|     | E302859-002   | T.T. Covering Ass'y | 1    |             |      |
| 8   | E24287-001    | Turn Table          | 1    |             |      |
| 9   | E10897-001    | Cabinet             | 1    |             |      |
| 10  | E10897-002    | Cabinet             | 1    |             |      |
| 11  | SBST3018Z     | Tapping Screw       | 4    |             |      |
| 12  | E69879-001    | Belt                | 1    |             |      |
| 14  | E70624-001    | F. Rubber           | 4    |             |      |
|     | E70593-001    | Special Screw       | 4    |             |      |
| 15  | E50670-005    | Wire Clamp          | 1    |             |      |
| 16  | SBST3006Z     | Tapping Screw       | 57   |             |      |
| 17  | E24483-004    | T.T. Base           | 1    |             |      |
| 18  | E70595-001    | Motor Bracket       | 1    |             |      |
| 19  | E67824-004    | Pulley              | 1    |             |      |
| 20  | SPSP2003Z     | Screw               | 2    |             |      |
| 21  | E24482-003    | Rear Panel          | 1    |             |      |
| 22  | E70844-001    | Shaft               | 1    |             |      |
| 23  | E71087-001    | Loading Roller      | 1    |             |      |
| 24  | E70845-001    | Special Screw       | 2    |             |      |
| 25  | E70585-001    | C. Board Holder     | 7    |             |      |
| 26  | E10894-003    | Loading Base        | 1    |             |      |
| 27  | E71091-001    | Cover (L)           | 1    |             |      |
| 28  | E71092-002    | Cover (R)           | 1    |             |      |
| 29  | E71084-001    | Ball Holder         | 1    |             |      |
| 30  | G41505-5      | Steel Ball          | 4    |             |      |
| 31  | E302840-003   | Gear Ass'y          | 1    |             |      |
| 32  | E302841-002   | Gear Base Ass'y     | 1    |             |      |
| 33  | E302848-001   | Pulley              | 1    |             |      |
| 34  | E302846-001   | Gear (A)            | 1    |             |      |
| 35  | E302847-001   | Gear (B)            | 1    |             |      |
| 36  | E70611-001    | Gear (C)            | 1    |             |      |
| 37  | REE3000X      | E. Ring             | 2    |             |      |
| 38  | E24488-002    | Front Panel         | 1    |             |      |
|     | E24488-001    | Front Panel         | 1    |             |      |
| 39  | E71174-001    | Sheet               | 1    |             |      |
| 40  | E302815-003   | Cap                 | 1    |             |      |
| 41  | E302815-004   | Cap                 | 1    |             |      |
| 42  | E70632-001    | Button (B)          | 1    |             |      |
| 43  | E70631-001    | Button (A)          | 1    |             |      |
| 44  | E70631-002    | Button (A)          | 1    |             |      |
| 45  | EX0030008N30S | Felt Spacer         | 1    |             |      |
| 46  | E302860-001   | Frame               | 1    |             |      |
| 47  | E24523-001    | Escutcheon (R)      | 1    |             |      |
| 48  | E302926-002   | Escutcheon (L)      | 1    |             |      |
| 49  | E302926-001   | Escutcheon (L)      | 1    |             |      |
| 50  | E302928-001   | Front Panel         | 1    |             |      |
| 51  | E70634-001    | Filter              | 1    |             |      |
| 52  | E302927-001   | Window              | 1    |             |      |
|     | E70586-001    | Bracket             | 1    |             |      |

△ : Safety parts

| No.           | Part Number    | Part Name         | Q'ty | Description | Area              |
|---------------|----------------|-------------------|------|-------------|-------------------|
| 53            | E70589-001     | Rollar            | 1    |             |                   |
| 54            | E70590-002     | Shaft             | 1    |             |                   |
| 55            | SBSB3008M      | Tapping Screw     | 1    |             |                   |
| 56            | E10893-002     | Bottom Board      | 1    |             |                   |
| 57            | E47227-021     | Foot              | 4    |             |                   |
| 58            | E70585-002     | C. Board Holder   | 3    |             | Except J,C<br>J,C |
| 59            | E70585-003     | C. Board Holder   | 3    |             |                   |
| △ 60          | SBST3012Z      | Tapping Screw     | 7    |             | Except BS<br>BS   |
| QHS3876-162   |                | Cord Stopper      | 2    |             |                   |
| QHS3876-162BS |                | Cord Stopper      | 2    |             |                   |
| 61            | E71083-002     | Ball Holder       | 1    |             |                   |
| 62            | E302844-001    | Rack              | 1    |             |                   |
| 63            | E47227-022     | Foot              | 2    |             |                   |
| 64            | E302941-002    | Cam               | 1    |             |                   |
| 65            | SSSB2606M      | Screw             | 2    | R           |                   |
| 66            | REE2000X       | E. Ring           |      |             |                   |
| 67            | E303182-001    | Lever Base Ass'y  | 1    |             |                   |
| 68            | E71085-001     | L. Base Sub Ass'y | 1    |             |                   |
| 69            | E302858-001    | Lever (A)         | 1    |             |                   |
| 70            | E70592-001     | Lever (B)         | 1    |             |                   |
| 71            | E70629-001     | Spring (A)        | 1    |             |                   |
| 72            | E70630-001     | Spring (B)        | 1    |             |                   |
| 73            | E303182-002    | Lever Base Ass'y  | 1    |             |                   |
| 74            | E70592-002     | Lever (B)         | 1    | R           |                   |
| 75            | E70629-002     | Spring (A)        |      |             |                   |
| 76            | E302858-002    | Lever (A)         |      |             |                   |
| 77            | E70630-001     | Spring (B)        | 1    |             |                   |
| 78            | E71085-001     | L. Base Sub Ass'y | 1    |             |                   |
| 79            | REE3000X       | E. Ring           | 2    |             |                   |
| 80            | E71162-001     | Wire Plate        | 1    |             |                   |
| 81            | E24484-002     | Door Ass'y        | 1    |             |                   |
| 82            | E302857-002    | Door Lever        | 1    |             |                   |
| 83            | E302857-001    | Door Lever        | 1    | R           |                   |
| 84            | E70628-001     | Special Screw     | 2    | L           |                   |
| 85            | E302941-001    | Cam               | 1    |             |                   |
| 86            | E24486-002     | Door              | 1    |             |                   |
| 87            | E71220-001     | Stopper           | 1    |             |                   |
| 88            | E71218-001     | Roller Shaft      | 1    |             |                   |
| 89            | E71294-001     | Spring            | 1    |             |                   |
| 90            | E302843-001    | Ball Holder       | 1    |             |                   |
| 91            | E70637-001     | Slide Knob        | 2    |             |                   |
| 92            | E70636-002     | Power Button      | 1    |             |                   |
| 93            | E10896-001     | Door Base         | 1    |             |                   |
| 94            | SSST3006M      | Tapping Screw     | 6    |             |                   |
| 95            | E71161-001     | Sheet             | 1    |             |                   |
| 96            | E60134-001     | Special Screw     | 2    |             |                   |
| 97            | E71217-001     | Roller Bracket    | 1    |             |                   |
| 98            | E70328-002     | Stylus Cover      | 1    |             |                   |
| 99            | E66052-001     | Special Screw     | 1    |             |                   |
| △ 100         | QMP1200-200    | Power Cord        | 1    |             | J,C               |
|               | QMP7600-250    | Power Cord        | 1    |             | U,P,PG            |
|               | QMP3900-200    | Power Cord        | 1    |             | E,G,ES            |
|               | QMP2560-244    | Power Cord        | 1    |             | A                 |
|               | QMP9017-008BS  | Power Cord        | 1    |             | BS                |
| 101           | EWP306-001     | Signal Cord       | 1    |             |                   |
| △ 102         | E03830-001     | Connector         | 1    |             | J,C               |
| 103           | E71518-001     | Cover             | 1    |             | Except J,C        |
|               | E71554-001     | Cover             | 1    |             | J,C               |
| 104           | E71535-001     | Trans. Bracket    | 1    |             |                   |
| 105           | E60134-001     | Special Screw     | 2    |             |                   |
| 106           | E50670-005     | Wire Clamp        | 2    |             |                   |
| △ 107         | ETP1010-17JA   | Power Transformer | 1    |             | J,C               |
|               | ETP1010-17ZA   | Power Transformer | 1    |             | U,P,PG            |
|               | ETP1010-17EA   | Power Transformer | 1    |             | E,A,G,ES          |
|               | ETP1010-17EABS | Power Transformer | 1    |             | BS                |
| △ 108         | QSR0085-007    | Voltage Selector  | 1    |             |                   |
| △ 109         | E303428-001    | Primary Case      | 1    |             | U,P,PG            |
| △ 110         | E303429-001    | Primary Cover     | 1    |             | E,A,G,BS,ES       |
| 111           | SBSF3008Z      | Tapping Screw     | 1    |             | E,A,G,BS,ES       |
| 112           | E10907-001     | Base Joint        | 1    |             | E,A,G,BS,ES       |
|               | E10907-002     | Base Joint        | 1    |             | Except J          |
|               |                |                   |      |             | J                 |

# Exploded View of Mechanism

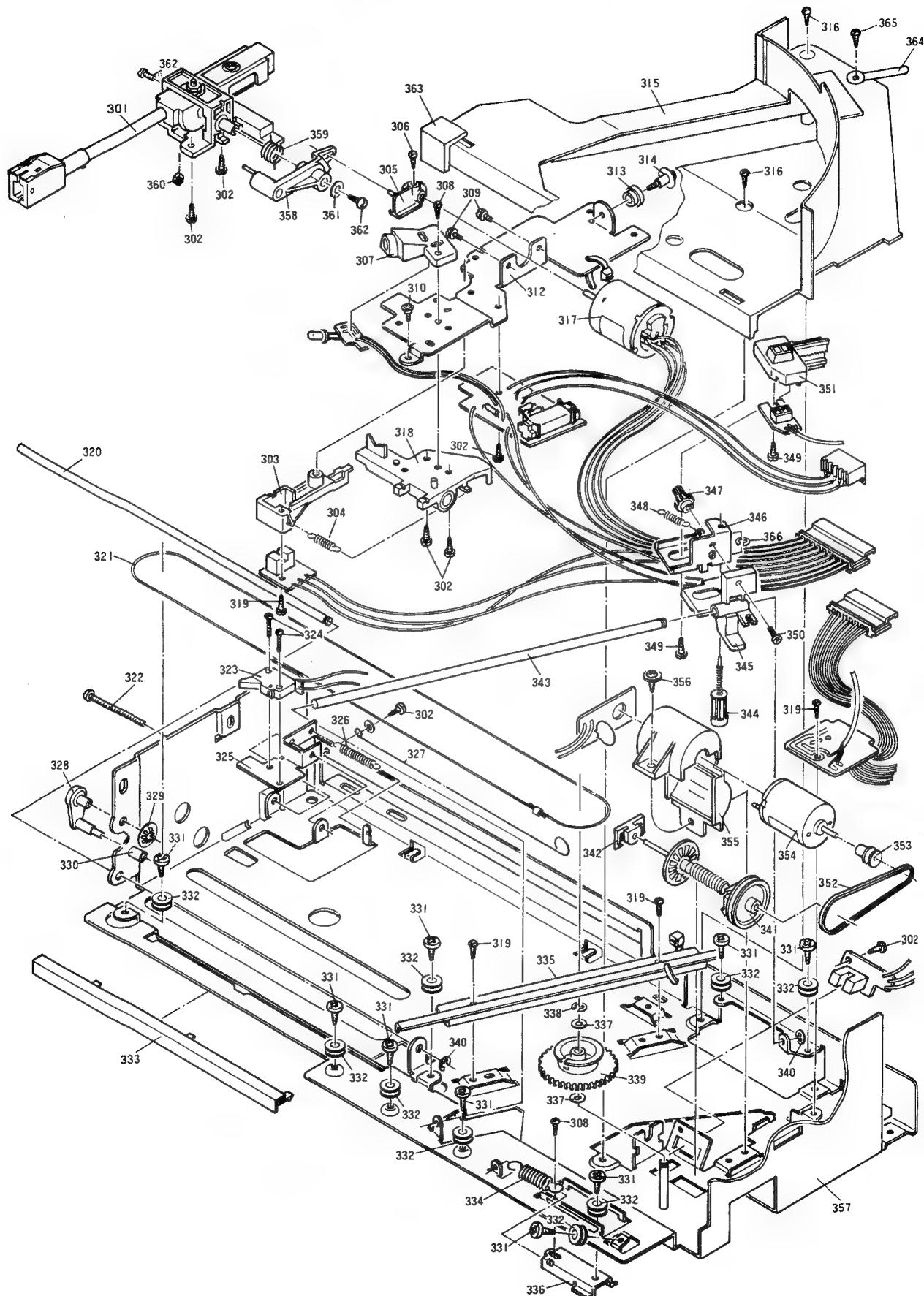


Fig. 5

**Mechanism Ass'y List**

| Item | Part Number   | Part Name                | Q'ty | Description |
|------|---------------|--------------------------|------|-------------|
| 301  | E24524-001    | Tonearm Ass'y            | 1    |             |
| 302  | SBST3006Z     | Screw                    | 5    |             |
| 303  | E302897-001   | Lever                    | 1    |             |
| 304  | E70604-001    | Spring                   | 1    |             |
| 305  | E70601-001    | Cueing Lever (A)         | 1    |             |
| 306  | SPSP3006Z     | Screw                    | 1    |             |
| 307  | E70625-001    | LED Holder               | 1    |             |
| 308  | SBST3008Z     | Screw                    | 1    |             |
| 309  | LPSP3005Z     | "                        | 2    |             |
| 310  | DBST3006Z     | "                        | 1    |             |
| 312  | E302849-002   | Arm Base                 | 1    |             |
| 313  | E70602-001    | Roller                   | 1    |             |
| 314  | E69851-001    | Screw                    | 1    |             |
| 315  | E24481-003    | M. Cover (A)             | 1    |             |
| 316  | SBST3018Z     | Screw                    | 2    |             |
| 317  | E302538-002   | Motor                    | 1    |             |
| 318  | E70603-002    | Hook Ass'y               | 1    |             |
| 319  | SBSF3006Z     | Screw                    | 1    |             |
| 320  | E70607-001    | Arm Shaft                | 1    |             |
| 321  | E70623-002    | Rope Ass'y               | 1    |             |
| 322  | SPSP3035M     | Screw                    | 1    |             |
| 323  | QSS1201-034   | Slide Switch             | 1    |             |
| 324  | SPSP2008Z     | Screw                    | 2    |             |
| 325  | E70608-001    | Switch Bracket           | 1    |             |
| 326  | E70609-001    | Spring                   | 1    |             |
| 327  | E71089-001    | "                        | 1    |             |
| 328  | E70605-001    | Lever                    | 1    |             |
| 329  | E70007-001    | Speed Nut                | 1    |             |
| 330  | E70267-002    | Rubber Tube              | 4    |             |
| 331  | E70620-001    | Screw                    | 8    |             |
| 332  | E70619-001    | Roller                   | 9    |             |
| 333  | E70633-001    | M. Cover (B)             | 1    |             |
| 334  | E70622-001    | Spring                   | 1    |             |
| 335  | E70616-001    | Bracket                  | 1    |             |
| 336  | E70621-002    | Roller Bracket           | 1    |             |
| 337  | Q03093-817    | Spacer                   | 2    |             |
| 338  | REE3000X      | E Ring                   | 1    |             |
| 339  | E302855-001   | Warm Wheel               | 1    |             |
| 340  | REE2500X      | E Ring                   | 2    |             |
| 341  | E302856-001   | Warm Ass'y               | 1    |             |
| 342  | E69875-001    | Bearing Stand            | 1    |             |
| 343  | E70610-001    | Shaft (B)                | 1    |             |
| 344  | E70613-001    | Warm                     | 1    |             |
| 345  | E302852-001   | Holder                   | 1    |             |
| 346  | E302853-001   | Bracket                  | 1    |             |
| 347  | E70614-001    | Gear (S)                 | 1    |             |
| 348  | E70612-001    | Spring                   | 1    |             |
| 349  | SBSB2605Z     | Screw                    | 2    |             |
| 350  | LPS2606Z      | "                        | 1    |             |
| 351  | E302851-001   | Case                     | 1    |             |
| 352  | E69879-001    | Belt                     | 1    |             |
| 353  | E67824-004    | Pully                    | 1    |             |
| 354  | E300763-005   | Motor                    | 1    |             |
| 355  | E302854-001   | Motor Holder             | 1    |             |
| 356  | E69851-004    | Screw                    | 1    |             |
| 357  | E10895-001    | Mechanism Base Sub Ass'y | 1    |             |
| 358  | E302863-001   | Cueing Lever (B)         | 1    |             |
| 359  | E70645-001    | Spring                   | 1    |             |
| 360  | NTB2600       | Nut                      | 1    |             |
| 361  | E67605-001    | Washer                   | 1    |             |
| 362  | SPSP2608Z     | Screw                    | 1    |             |
| 363  | EX0025012N10S | Spacer                   | 1    |             |
| 364  | E50670-005    | Wire Clamp               | 1    |             |
| 365  | SBSF3006Z     | Screw                    | 1    |             |
| 366  | E71331-001    | E Ring                   | 1    |             |

# Printed Circuit Board Ass'y and Parts List

## ENL-009□ Main P.C. Board Ass'y

Note: ENL-009□ varies according to the areas employed. See note (1) when replacing an order.

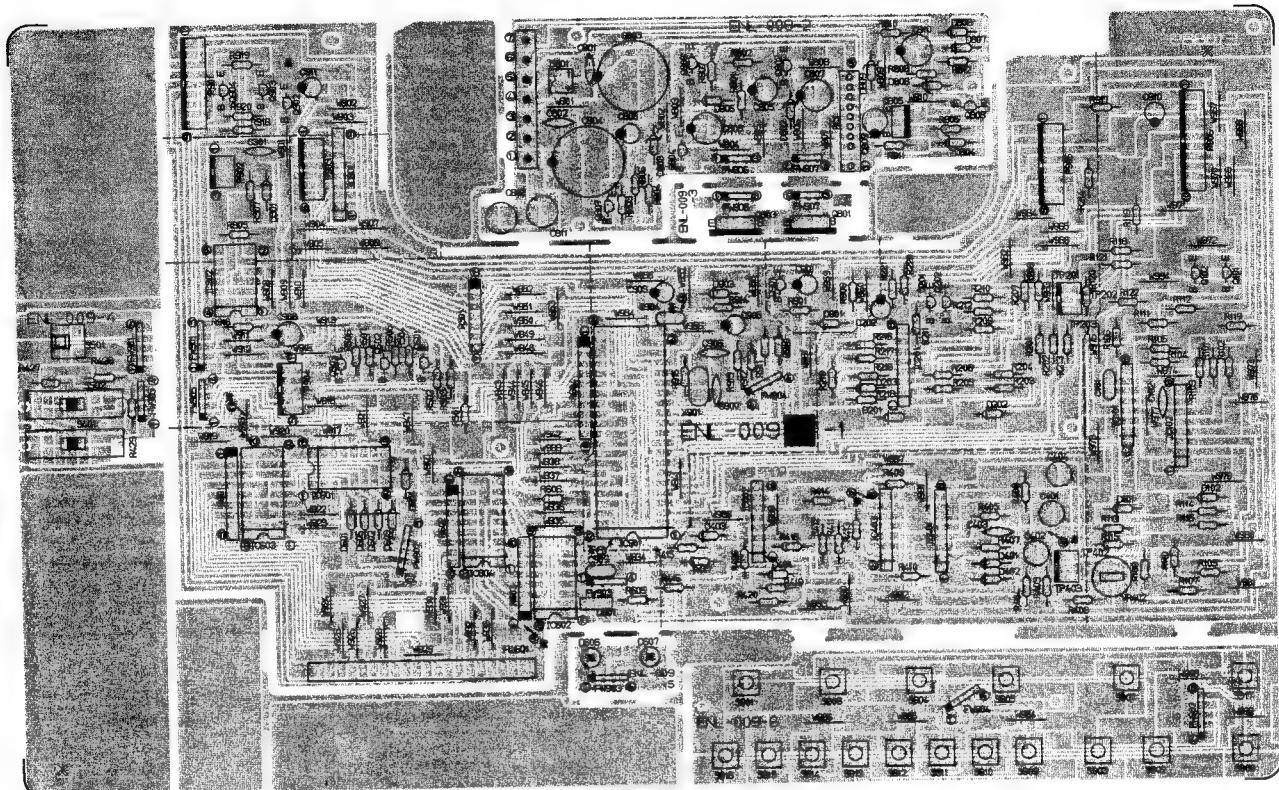


Fig. 6

### Note (1)

| Designated Areas                                              | P.C. Board Ass'y |
|---------------------------------------------------------------|------------------|
| U.S.A., Canada                                                | ENL-009 □ D      |
| Europe, Australia,<br>U.S. Military Market<br>Other Countries | ENL-009 □ B      |
| U.K.                                                          | ENL-009 □ E      |

### Note (2)

The symbols ( 赤, 黒, 白 ....etc.) on P.C. Board surface are factory process only.

### Each Individual P.C. Board Location

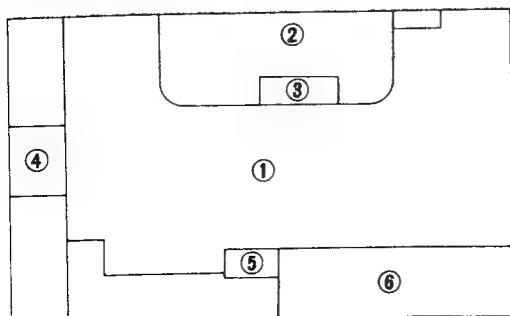


Fig. 7

- |   |           |                                   |
|---|-----------|-----------------------------------|
| ① | ENL-009-1 | Main P.C. Board Ass'y             |
| ② | ENL-009-2 | Power Supply P.C. Board Ass'y     |
| ③ | ENL-009-3 | Power Transistor P.C. Board Ass'y |
| ④ | ENL-009-4 | Power Switch P.C. Board Ass'y     |
| ⑤ | ENL-009-5 | Indicator P.C. Board Ass'y        |
| ⑥ | ENL-009-6 | Function P.C. Board Ass'y         |

## Transistors

| Item No. | Parts Number  | Description |         |
|----------|---------------|-------------|---------|
|          |               | Maker       |         |
| Q102     | 2SA1015(Y,GR) | Silicon     | Toshiba |
| Q201     | 2SC2120(O,Y)  | Silicon     | Toshiba |
| Q202     | 2SA950(O,Y)   | Silicon     | Toshiba |
| Q501     | 2SA1015(Y,GR) | Silicon     | Toshiba |
| Q502     | 2SA1015(Y,GR) | Silicon     | Toshiba |
| Q503     | 2SC1815(Y,GR) | Silicon     | Toshiba |
| Q801     | 2SB1015(O,Y)  | Silicon     | Toshiba |
| Q802     | 2SC1815(Y,GR) | Silicon     | Toshiba |
| Q803     | 2SD1406(O,Y)  | Silicon     | Toshiba |
| Q804     | 2SA1015(Y,GR) | Silicon     | Toshiba |
| Q805     | 2SD1189(Q,R)  | Silicon     | Rohm    |
| Q806     | 2SC1815(Y,GR) | Silicon     | Toshiba |
| Q807     | 2SC1815(Y,GR) | Silicon     | Toshiba |
| Q808     | 2SB560(E,F)   | Silicon     | Sanyo   |
| Q901     | 2SC1815(Y,GR) | Silicon     | Toshiba |
| Q902     | 2SC1815(Y,GR) | Silicon     | Toshiba |
| Q903     | 2SC1815(Y,GR) | Silicon     | Toshiba |
| Q904     | 2SA1015(Y,GR) | Silicon     | Toshiba |

## ICs

| Item No. | Parts Number  | Description |            |
|----------|---------------|-------------|------------|
|          |               | Maker       |            |
| IC101    | M5218L        |             | Mitsubishi |
| IC102    | M5218L-V      |             | Mitsubishi |
| IC201    | M5218L        |             | Mitsubishi |
| IC301    | BA6208        |             | Sanyo      |
| IC302    | TC4069UBP     |             | Toshiba    |
| IC401    | M5218L        |             | Mitsubishi |
| IC402    | M5218L        |             | Mitsubishi |
| IC403    | M5218L        |             | Mitsubishi |
| IC601    | HD74LS42P     |             | Hitachi    |
| IC602    | HD74LS47P     |             | Hitachi    |
| IC603    | LB1240        |             | Sanyo      |
| IC604    | LB1240        |             | Sanyo      |
| IC901    | MB88401M-292K |             | Fuji       |

## Diodes

| Item No. | Parts Number | Description |         |
|----------|--------------|-------------|---------|
|          |              | Maker       |         |
| D101     | 1S2473       | Silicon     | Rohm    |
| D102     | 1S2473       | Silicon     | Rohm    |
| D150     | 1S2473       | Silicon     | Rohm    |
| D201     | 1S2473       | Silicon     | Rohm    |
| D202     | 1S2473       | Silicon     | Rohm    |
| D203     | 1S2473       | Silicon     | Rohm    |
| D301     | 1S2473       | Silicon     | Rohm    |
| D401     | 1S2473       | Silicon     | Rohm    |
| D402     | 1S2473       | Silicon     | Rohm    |
| D403     | 1S2473       | Silicon     | Rohm    |
| D404     | 1S2473       | Silicon     | Rohm    |
| D601     | 1S2473       | Silicon     | Rohm    |
| D602     | 1S2473       | Silicon     | Rohm    |
| D603     | 1S2473       | Silicon     | Rohm    |
| D604     | 1S2473       | Silicon     | Rohm    |
| D605     | 1S2473       | Silicon     | Rohm    |
| D606     | SLR-55VC50F  | L.E.D.      | Rohm    |
| D607     | SLR-55VC50F  | L.E.D.      | Rohm    |
| D801     | 1D4B42       | Silicon     | Toshiba |
| D802     | HZ12C2-L     | Silicon     | Hitachi |
| D803     | HZ12C2-L     | Silicon     | Hitachi |
| D804     | RD5.6EB3     | Zener       | NEC     |
| D805     | 1S2473       | Silicon     | Rohm    |
| D806     | 1S2076A      | Silicon     | Hitachi |
| D807     | 1S2076A      | Silicon     | Hitachi |
| D808     | HZ24-3L      | Zener       | Hitachi |
| D809     | RD5.6EB3     | Zener       | NEC     |
| D901     | 1S2473       | Silicon     | Rohm    |
| D903     | 1S2473       | Silicon     | Rohm    |

## Capacitor

| Item No. | Parts Number | Description |      |              |
|----------|--------------|-------------|------|--------------|
| C101     | QFV71HJ-473  | 0.047 MF    | 50 V | T. Film      |
| C102     | QCF31HP-103  | 0.01 MF     | 50 V | Ceramic      |
| C202     | QET61AM-476  | 47 MF       | 10 V | Electrolytic |
| C301     | QCF31HP-103  | 0.01 MF     | 50 V | Ceramic      |
| C401     | QEN61HM-105  | 1 MF        | 50 V | Non Pole     |
| C402     | QEN61HM-105  | 1 MF        | 50 V | Non Pole     |
| C403     | QCF31HP-103  | 0.01 MF     | 50 V | Ceramic      |
| C404     | QEN61HM-225  | 2.2 MF      | 50 V | Non Pole     |
| C801     | QCF31HP-103  | 0.01 MF     | 50 V | Ceramic      |
| C802     | QCF31HP-103  | 0.01 MF     | 35 V | Ceramic      |
| C803     | QEU51VM-108  | 1000 MF     | 35 V | Electrolytic |
| C804     | QEU51VM-108  | 1000 MF     | 35 V | Electrolytic |
| C805     | QET61CM-226  | 22 MF       | 16 V | Electrolytic |
| C806     | QET61CM-226  | 22 MF       | 16 V | Electrolytic |
| C807     | QET61EM-107  | 100 MF      | 25 V | Electrolytic |
| C808     | QET61EM-107  | 100 MF      | 25 V | Electrolytic |
| C809     | QET61CM-476  | 47 MF       | 16 V | Electrolytic |
| C810     | QET61HM-476  | 47 MF       | 50 V | Electrolytic |
| C811     | QEN61EM-476  | 47 MF       | 25 V | Electrolytic |
| C812     | QEN61EM-476  | 47 MF       | 25 V | Electrolytic |
| C813     | QCF31HP-473  | 0.047 MF    | 50 V | Ceramic      |
| C901     | QET61HM-105  | 1 MF        | 50 V | Electrolytic |
| C903     | QET61CM-476  | 47 MF       | 16 V | Electrolytic |
| C904     | QFV71HJ-104  | 0.1 MF      | 50 V | T. Film      |
| C905     | QET61HM-475  | 4.7 MF      | 50 V | T. Film      |
| C906     | QCT25CH-101  | 100 pF      | 50 V | Ceramic      |
| C907     | QCT25CH-101  | 100 pF      | 50 V | Ceramic      |
| C908     | QET61CM-476  | 47 MF       | 16 V | Electro      |
| C909     | QFV71HJ-104  | 0.1 MF      | 50 V | T. Film      |
| C910     | QET61CM-107  | 100 MF      | 16 V | Electrolytic |
| C911     | QET61EM-106  | 10 MF       | 25 V | Electrolytic |

## Resistors

| Item No. | Parts Number | Description |       |         |
|----------|--------------|-------------|-------|---------|
| R101     | QRD141J-102S | 1 K         | 1/4 W | Carbon  |
| R102     | QRD141J-102S | 1 K         | 1/4 W | Carbon  |
| R103     | QRD141J-223S | 22 K        | 1/4 W | Carbon  |
| R104     | QRD141J-102S | 1 K         | 1/4 W | Carbon  |
| R105     | QRD141J-273S | 27 K        | 1/4 W | Carbon  |
| R106     | QRD141J-271S | 270         | 1/4 W | Carbon  |
| R107     | QRD141J-124S | 120 K       | 1/4 W | Carbon  |
| R108     | QRD141J-221S | 220         | 1/4 W | Carbon  |
| R109     | QRD141J-124S | 120 K       | 1/4 W | Carbon  |
| R110     | QRD141J-332S | 3.3 K       | 1/4 W | Carbon  |
| R111     | QRD141J-103S | 10 K        | 1/4 W | Carbon  |
| R112     | QRD141J-103S | 10 K        | 1/4 W | Carbon  |
| R113     | QRD141J-123S | 12 K        | 1/4 W | Carbon  |
| R114     | QRD141J-123S | 12 K        | 1/4 W | Carbon  |
| R115     | QRD141J-103S | 10 K        | 1/4 W | Carbon  |
| R116     | QRD141J-103S | 10 K        | 1/4 W | Carbon  |
| R117     | QRD141J-4R7S | 4.7         | 1/4 W | Carbon  |
| R118     | QRD141J-104S | 100 K       | 1/4 W | Carbon  |
| R119     | QRD141J-153S | 15 K        | 1/4 W | Carbon  |
| R120     | QRD141J-122S | 1.2 K       | 1/4 W | Carbon  |
| R121     | QRD141J-103S | 10 K        | 1/4 W | Carbon  |
| R122     | QRD141J-682S | 6.8 K       | 1/4 W | Carbon  |
| R201     | QRD141J-102S | 1 K         | 1/4 W | Carbon  |
| R202     | QRD141J-102S | 1 K         | 1/4 W | Carbon  |
| R203     | QRD141J-333S | 33 K        | 1/4 W | Carbon  |
| R204     | QRD141J-333S | 33 K        | 1/4 W | Carbon  |
| R205     | QRD141J-333S | 33 K        | 1/4 W | Carbon  |
| R206     | QRD141J-333S | 33 K        | 1/4 W | Carbon  |
| R207     | QRD141J-392S | 3.9 K       | 1/4 W | Carbon  |
| R208     | QRD141J-392S | 3.9 K       | 1/4 W | Carbon  |
| R209     | QRD141J-271S | 270         | 1/4 W | Carbon  |
| R210     | QRD141J-564S | 560 K       | 1/4 W | Carbon  |
| R211     | QRZ0062-100  | 10          | 1/4 W | Fusible |
| R212     | QRZ0062-100  | 10          | 1/4 W | Fusible |
| R213     | QRD141J-222S | 2.2 K       | 1/4 W | Carbon  |
| R214     | QRD141J-271S | 270         | 1/4 W | Carbon  |
| R215     | QRD141J-103S | 10 K        | 1/4 W | Carbon  |
| R216     | QRD141J-564S | 560 K       | 1/4 W | Carbon  |
| R217     | QRD141J-473S | 47 K        | 1/4 W | Carbon  |

▲ : Safety Parts

## Others

| Item No.      | Parts Number | Description |       |                |
|---------------|--------------|-------------|-------|----------------|
| R218          | QRD141J-123S | 12 K        | 1/4 W | Carbon         |
| R219          | QRD141J-103S | 10 K        | 1/4 W | Carbon         |
| R220          | QRD141J-102S | 1 K         | 1/4 W | Carbon         |
| R221          | QRD141J-102S | 1 K         | 1/4 W | Carbon         |
| R305          | QRD141J-473S | 47 K        | 1/4 W | Carbon         |
| R307          | QRD141J-473S | 47 K        | 1/4 W | Carbon         |
| R403          | QRD141J-683S | 68 K        | 1/4 W | Carbon         |
| R404          | QRD141J-683S | 68 K        | 1/4 W | Carbon         |
| R405          | QRD141J-103S | 10 K        | 1/4 W | Carbon         |
| R406          | QRD141J-102S | 1 K         | 1/4 W | Carbon         |
| R407          | QRD141J-184S | 180 K       | 1/4 W | Carbon         |
| R408          | QRD141J-103S | 10 K        | 1/4 W | Carbon         |
| R409          | QRD141J-103S | 10 K        | 1/4 W | Carbon         |
| R410          | QRD141J-103S | 10 K        | 1/4 W | Carbon         |
| R411          | QRD141J-822S | 8.2 K       | 1/4 W | Carbon         |
| R412          | QRD141J-473S | 47 K        | 1/4 W | Carbon         |
| R413          | QRD141J-104S | 100 K       | 1/4 W | Carbon         |
| R414          | QRD141J-124S | 120 K       | 1/4 W | Carbon         |
| R415          | QRD141J-123S | 12 K        | 1/4 W | Carbon         |
| R416          | QRD141J-103S | 10 K        | 1/4 W | Carbon         |
| R417          | QRD141J-223S | 22 K        | 1/4 W | Carbon         |
| R418          | QRD141J-103S | 10 K        | 1/4 W | Carbon         |
| R419          | QRD141J-123S | 12 K        | 1/4 W | Carbon         |
| R420          | QRD141J-103S | 10 K        | 1/4 W | Carbon         |
| R426          | QRD141J-822S | 8.2 K       | 1/4 W | Carbon         |
| R427          | QRD141J-332S | 3.3 K       | 1/4 W | Carbon         |
| R428          | QRD141J-822S | 8.2 K       | 1/4 W | Carbon         |
| R429          | QRD141J-273S | 27 K        | 1/4 W | Carbon         |
| R501          | QRD141J-223S | 22 K        | 1/4 W | Carbon         |
| R502          | QRD141J-472S | 4.7 K       | 1/4 W | Carbon         |
| R503          | QRD141J-102S | 1 K         | 1/4 W | Carbon         |
| R504          | QRD141J-223S | 22 K        | 1/4 W | Carbon         |
| R505          | QRD141J-103S | 10 K        | 1/4 W | Carbon         |
| R505          | QRD141J-103S | 10 K        | 1/4 W | Carbon         |
| R506          | QRD141J-223S | 22 K        | 1/4 W | Carbon         |
| R507          | QRD141J-473S | 47 K        | 1/4 W | Carbon         |
| R605          | QRD141J-391S | 390         | 1/4 W | Carbon         |
| R606          | QRD141J-102S | 1 K         | 1/4 W | Carbon         |
| R801          | QRD141J-392S | 3.9 K       | 1/4 W | Carbon         |
| R802          | QRD141J-181S | 180         | 1/4 W | Carbon         |
| R803          | QRD141J-392S | 3.9 K       | 1/4 W | Carbon         |
| R804          | QRD141J-181S | 180         | 1/4 W | Carbon         |
| R805          | QRD141J-561S | 560         | 1/4 W | Carbon         |
| R806          | QRD141J-473S | 47 K        | 1/4 W | Carbon         |
| R807          | QRD141J-472S | 4.7 K       | 1/4 W | Carbon         |
| R808          | QRD148J-271S | 270         | 1/4 W | Carbon         |
| R810          | QRD141J-223S | 22 K        | 1/4 W | Carbon         |
| R811 $\Delta$ | QRZ0062-100  | 10          | 1/4 W | Fusible        |
| R812          | QRD148J-222S | 2.2 K       | 1/4 W | Carbon         |
| R901          | QRD141J-103S | 10 K        | 1/4 W | Carbon         |
| R909          | QRD141J-223S | 22 K        | 1/4 W | Carbon         |
| R910          | QRD141J-223S | 22 K        | 1/4 W | Carbon         |
| R911          | QRD141J-223S | 22 K        | 1/4 W | Carbon         |
| R912          | QRD141J-223S | 22 K        | 1/4 W | Carbon         |
| R913          | QRD141J-223S | 22 K        | 1/4 W | Carbon         |
| R914          | QRD141J-103S | 10 K        | 1/4 W | Carbon         |
| R915          | QRD141J-681S | 680         | 1/4 W | Carbon         |
| R916          | QRD141J-101S | 100         | 1/4 W | Carbon         |
| R917          | QRD141J-101S | 100         | 1/4 W | Carbon         |
| R918          | QRD141J-473S | 47 K        | 1/4 W | Carbon         |
| R919          | QRD141J-473S | 47 K        | 1/4 W | Carbon         |
| R920          | QRD141J-223S | 22 K        | 1/4 W | Carbon         |
| VR402         | QVP4A0B-103  | 10 K        | 0.1 W | Variable       |
| R301          | ERGS6XK-103  | 10 K        |       | Resistor Array |
| R601          | ERGS8XK-473  | 47 K        |       | Resistor Array |
| R602          | ERGS7XK-473  | 47 K        |       | Resistor Array |
| R603          | ERGS7XK-103  | 10 K        |       | Resistor Array |
| R604          | ERGS9XK-103  | 10 K        |       | Resistor Array |

 $\Delta$  : Safety Parts

| Item No. | Parts Number  | Description       |  |  |
|----------|---------------|-------------------|--|--|
|          | QMV5005-003   | 3P Plug Ass'y     |  |  |
|          | QMV5005-005   | 5P Plug Ass'y     |  |  |
|          | QMV5005-006   | 6P Plug Ass'y     |  |  |
|          | QMV5005-008   | 8P Plug Ass'y     |  |  |
|          | QMV5005-009   | 9P Plug Ass'y     |  |  |
|          | QMV5005-010   | 10P Plug Ass'y    |  |  |
|          | E67764-007    | Terminal Ass'y    |  |  |
|          | EWT011-064    | Terminal Wire     |  |  |
|          | E10889-102    | Circuit Board     |  |  |
|          | SBST3008Z     | Screw             |  |  |
| S401     | E70588-001    | Heat Sink         |  |  |
| S501     | E67910-001    | Spacer            |  |  |
| S502     | QSS2301-011   | Slide Switch      |  |  |
| S901     | ESP0001-007   | Push Switch       |  |  |
| S902     | ESP0001-007   | Push Switch       |  |  |
| S903     | ESP0001-007   | Push Switch       |  |  |
| S904     | ESP0001-007   | Push Switch       |  |  |
| S905     | ESP0001-007   | Push Switch       |  |  |
| S906     | ESP0001-007   | Push Switch       |  |  |
| S907     | ESP0001-007   | Push Switch       |  |  |
| S908     | ESP0001-007   | Push Switch       |  |  |
| S909     | ESP0001-007   | Push Switch       |  |  |
| S910     | ESP0001-007   | Push Switch       |  |  |
| S911     | ESP0001-007   | Push Switch       |  |  |
| S912     | ESP0001-007   | Push Switch       |  |  |
| S913     | ESP0001-007   | Push Switch       |  |  |
| S914     | ESP0001-007   | Push Switch       |  |  |
| S915     | ESP0001-007   | Push Switch       |  |  |
| S916     | ESP0001-007   | Push Switch       |  |  |
| S917     | ESP0001-007   | Push Switch       |  |  |
| FL601    | ELU0001-020   | FL. Tube          |  |  |
| L601     | EQL3001-102KY | Inductor          |  |  |
| X901     | ECX0004-190KU | Ceramic Resonator |  |  |

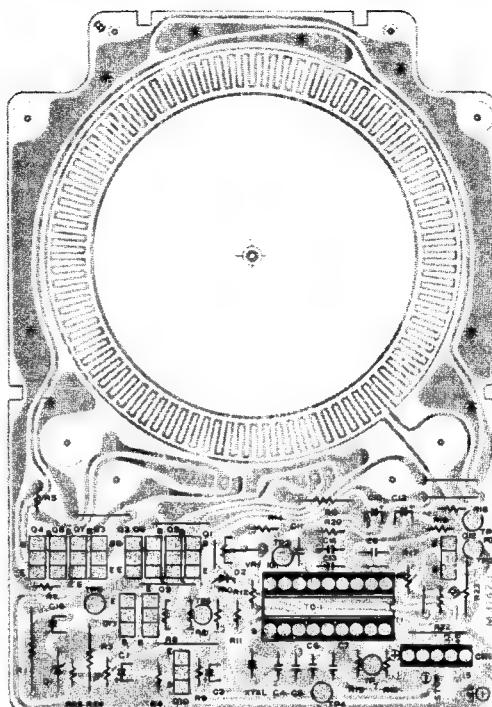
**MC953D Motor Drive P.C. Board Ass'y**

Fig. 8

**IC**

| Item No. | Parts Number | Rating | Description |
|----------|--------------|--------|-------------|
| IC1      | VC4052       |        | IC          |

**Transistors**

| Item No. | Parts Number  | Rating | Description     |
|----------|---------------|--------|-----------------|
| Q1       | 2SC2120(O,Y)  |        | Silicon Toshiba |
| Q2       | 2SC2120(O,Y)  |        | Silicon Toshiba |
| Q3       | 2SA950(O,Y)   |        | Silicon Toshiba |
| Q4       | 2SA950(O,Y)   |        | Silicon Toshiba |
| Q5       | 2SA1015(Y,GR) |        | Silicon Toshiba |
| Q6       | 2SA1015(Y,GR) |        | Silicon Toshiba |
| Q7       | 2SC1815(Y,GR) |        | Silicon Toshiba |
| Q8       | 2SC1815(Y,GR) |        | Silicon Toshiba |
| Q9       | 2SA1015(GR)   |        | Silicon Toshiba |
| Q10      | 2SC1815(GR)   |        | Silicon Toshiba |
| Q12      | 2SC1815(Y,GR) |        | Silicon Toshiba |
| Q13      | 2SC2120(O,Y)  |        | Silicon Toshiba |

**Capacitors**

| Item No. | Parts Number | Rating             | Description   |
|----------|--------------|--------------------|---------------|
| C1       | QET41HM-474  | 0.47 $\mu$ F 50 V  | Electrolytic  |
| C2       | QET41HM-225  | 2.2 $\mu$ F 50 V   | Electrolytic  |
| C3       | QET41HM-105  | 1 $\mu$ F 50 V     | Electrolytic  |
| C4       | QCT25CH-101  | 100 pF 16 V        | Ceramic       |
| C5       | QCT25CH-101  | 100 pF 16 V        | Ceramic       |
| C6       | QFM41HK-223  | 0.022 $\mu$ F 50 V | Film          |
| C7       | AWS104G-50   | 0.1 $\mu$ F 50 V   | Polypropylene |
| C8       | QCF31HP-103  | 0.01 $\mu$ F 50 V  | Ceramic       |
| C9       | QET41CM-336  | 33 $\mu$ F 16 V    | Electrolytic  |
| C10      | QET41HM-105  | 1.0 $\mu$ F 50 V   | Electrolytic  |
| C11      | QCT25UJ-330  | 33 pF 50 V         | Ceramic       |
| C12      | QET41EM-106  | 10 $\mu$ F 25 V    | Electrolytic  |
| C13      | QCF31HP-103  | 0.01 $\mu$ F 50 V  | Ceramic       |
| C14      | QCY31HK-102  | 0.001 $\mu$ F 50 V | Ceramic       |
| C15      | QCF31HP-103  | 0.01 $\mu$ F 50 V  | Ceramic       |
| C16      | QET41CM-106  | 10 $\mu$ F 16 V    | Electrolytic  |
| C17      | QCF31HP-103  | 0.01 $\mu$ F 50 V  | Ceramic       |
| C18      | QCF31HP-103  | 0.01 $\mu$ F 50 V  | Ceramic       |
| C19      | QCF31HP-223  | 0.022 $\mu$ F 50 V | Ceramic       |
| C20      | QCF31HP-223  | 0.022 $\mu$ F 50 V | Ceramic       |

**Diode**

| Item No. | Parts Number | Rating | Description |
|----------|--------------|--------|-------------|
| D1       | RD5.6EL3     |        | Zener       |

**Resistors**

| Item No. | Parts Number | Rating         | Description  |
|----------|--------------|----------------|--------------|
| R1       | QRX019J-2R7S | 2.7 $\Omega$   | 1 W Metal    |
| R2       | QRD167J-181  | 180 $\Omega$   | 1/6 W Carbon |
| R3       | QRD167J-101  | 100 $\Omega$   | 1/6 W Carbon |
| R4       | QRD167J-332  | 3.3 k $\Omega$ | 1/6 W Carbon |
| R5       | QRD167J-821  | 820 $\Omega$   | 1/6 W Carbon |
| R6       | QRD141J-102S | 1 k $\Omega$   | 1/4 W Carbon |
| R7       | QRD167J-471S | 470 $\Omega$   | 1/6 W Carbon |
| R8       | QRD167J-102  | 1 k $\Omega$   | 1/6 W Carbon |
| R9       | QRD167J-103  | 10 k $\Omega$  | 1/6 W Carbon |
| R10      | QRD167J-163  | 16 k $\Omega$  | 1/6 W Carbon |
| R11      | QRD167J-474  | 470 k $\Omega$ | 1/6 W Carbon |
| R12      | QRD167J-104  | 100 k $\Omega$ | 1/6 W Carbon |
| R13      | QRD167J-913  | 91 k $\Omega$  | 1/6 W Carbon |
| R14      | QRD167J-104  | 100 k $\Omega$ | 1/6 W Carbon |
| R15      | QRV146F-2702 | 27 k $\Omega$  | 1/4 W Metal  |
| R16      | QRD167J-474  | 470 k $\Omega$ | 1/6 W Carbon |
| R17      | QRD167J-101  | 100 $\Omega$   | 1/6 W Carbon |
| R18      | QRD167J-102  | 1 k $\Omega$   | 1/6 W Carbon |
| R19      | QRD167J-104  | 100 k $\Omega$ | 1/6 W Carbon |
| R20      | QRD167J-105  | 1 M $\Omega$   | 1/6 W Carbon |
| R21      | QRD167J-101  | 100 $\Omega$   | 1/6 W Carbon |
| R22      | QRD167J-183  | 18 k $\Omega$  | 1/6 W Carbon |
| R23      | QRD141J-101S | 100 $\Omega$   | 1/4 W Carbon |
| R24      | QRD121J-271  | 270 $\Omega$   | 1/2 W Carbon |
| R25      | QRD167J-153  | 15 k $\Omega$  | 1/6 W Carbon |

△ : Safety Parts

**Others**

| Item No. | Parts Number                                | Rating | Description                                                    |
|----------|---------------------------------------------|--------|----------------------------------------------------------------|
| X1       | LA-1157<br>QMV5004-005<br>VHE-101<br>M31469 |        | X'tal<br>Micro Connector<br>Hall Generator<br>P. Circuit Board |

## Muting P.C. Board Ass'y

### Note

The symbols ( 赤, 黒, 白....etc.) on P.C. Board surface are factory process only.

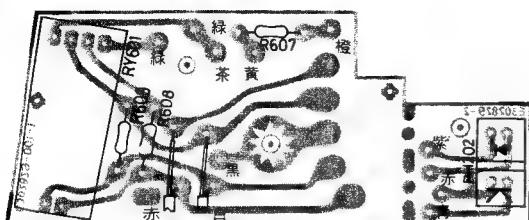


Fig. 9

| Item No. | Parts Number              | Description |                               |
|----------|---------------------------|-------------|-------------------------------|
| R607     | QRD148J-102               | 1 K         | 1/4 W Carbon Resistor         |
| R608     | QRD148J-474               | 470 K       | 1/4 W Carbon Resistor         |
| R609     | QRD148J-474               | 470 K       | 1/4 W Carbon Resistor         |
| RY601    | ESK2D12-213               |             | Relay                         |
| PH202    | TLP-801A-V<br>E302829-001 |             | Phot Intalaptor<br>P.C. Board |

## Sensor P.C. Board Ass'y

### Note

The symbols ( 赤, 黒, 白....etc.) on P.C. Board surface are factory process only.

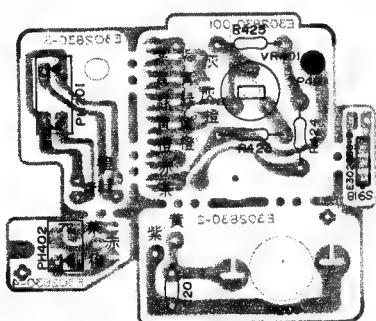


Fig. 10

| Item  | Part Number               | Description |                         |
|-------|---------------------------|-------------|-------------------------|
| C405  | QCF21HP-102               | 1000 pF     | 50 V Ceramic Capacitor  |
| R423  | QRD148J-103               | 10 K        | 1/4 W Carbon Resistor   |
| R424  | QRD148J-820               | 82          | 1/4 W Carbon Resistor   |
| R425  | QRD148J-820               | 82          | 1/4 W Carbon Resistor   |
| VR401 | QVP4AOB-224               | 220 K       | 0.1 W Variable Resistor |
| S918  | QSS1201-034               |             | Slide Switch            |
| M201  | E300763-005               |             | Motor                   |
| PH201 | TLP801A-V                 |             | Phot Intalaptor         |
| PH402 | RPR-359F                  |             | Intalaptor              |
| TP401 | E43727-002<br>E302830-002 |             | Tab<br>P.C. Board       |

## Signal P.C. Board Ass'y

### Note

The symbols ( 赤, 黒, 白....etc.) on P.C. Board surface are factory process only.

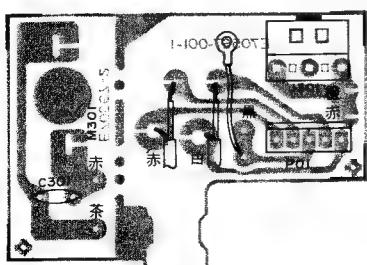


Fig. 11

| Item | Part Number                             | Description |                                       |
|------|-----------------------------------------|-------------|---------------------------------------|
| C301 | QEN51HM-225                             | 2.2 MF      | 50 V Non Pole Capacitor               |
| J301 | QMS3533-001                             |             | Jack                                  |
| P01  | QMV5004-005                             |             | 5P Plug Ass'y                         |
| M301 | E300763-005<br>E71219-001<br>E61215-001 |             | Motor<br>Sheeld Bracket<br>P.C. Board |

# Packing Materials and Part Numbers

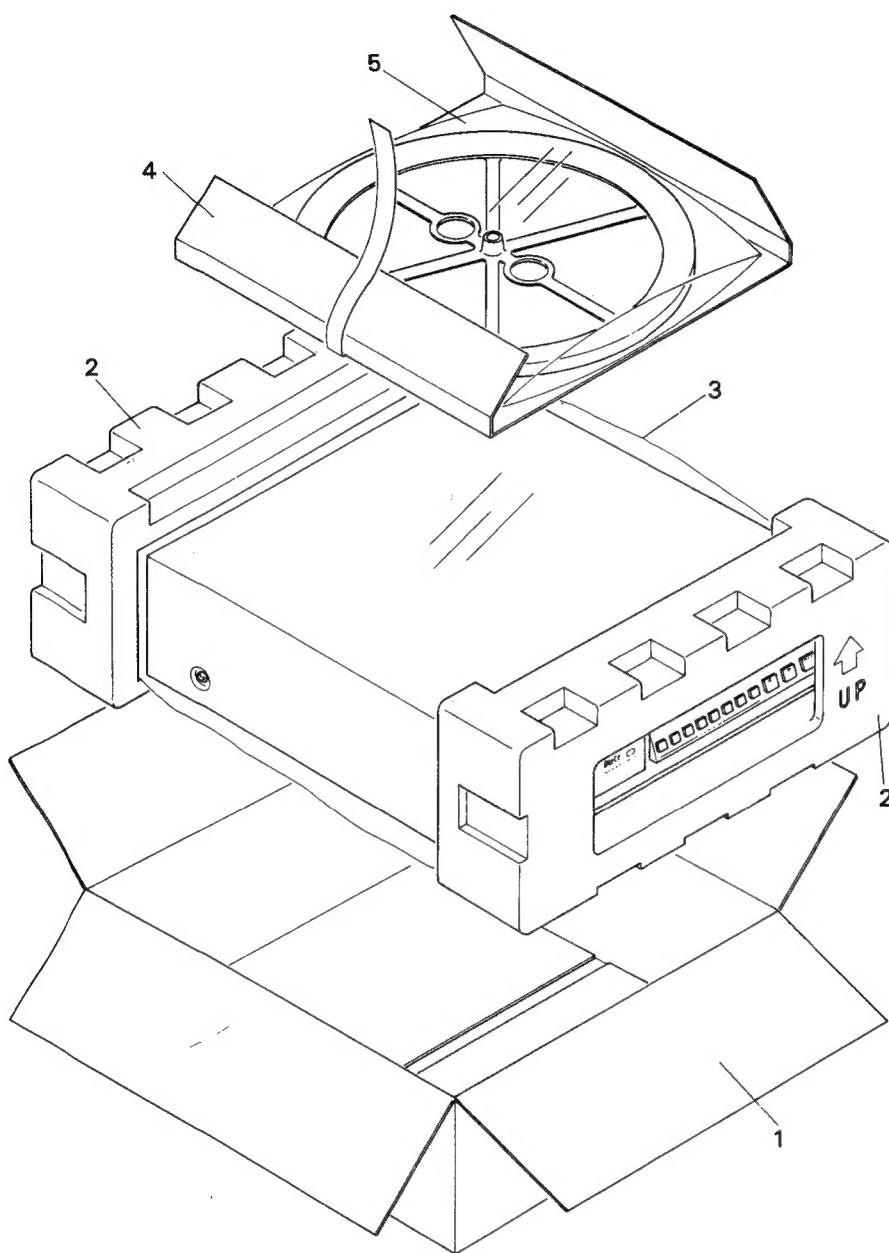


Fig. 12

## The Marks for Designated Areas.

|               |                     |
|---------------|---------------------|
| J .....       | U.S.A.              |
| C .....       | Canada              |
| E .....       | Europe              |
| G .....       | West Germany        |
| ES .....      | Spain               |
| P,PG .....    | U.S.Military Market |
| BS .....      | U.K.                |
| A .....       | Australia           |
| U .....       | Other Countries     |
| No mark ..... | All areas.          |

| No.    | Part Number                                                            | Part Name                                                       | Q'ty                  | Description              | Area                      |
|--------|------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------|--------------------------|---------------------------|
| 1      | PK-QLG90E (B)<br>PK-QLG90ES                                            | Packing Case<br>Packing Case                                    | 1<br>1                | E24775-001<br>E24775-002 | ES                        |
| 2      | NZ-QLG90                                                               | Fillers                                                         | 1                     | E24601-001               |                           |
| 3      | E300196-031<br>E300196-031B                                            | Envelope<br>Envelope                                            | 1<br>1                |                          | BS                        |
| 4<br>5 | E303152-001<br>E300196-039<br>E300196-039B<br>E35497-017<br>E35497-019 | Sheet<br>Envelope<br>Envelope<br>Caution Sheet<br>Caution Sheet | 1<br>1<br>1<br>1<br>1 | 110 V<br>220 V           |                           |
|        | E35246-001<br>E35246-004<br>E35246-006                                 | Serial Label<br>Serial Label<br>Serial Label                    | 1<br>1<br>1           |                          | J,C,U,P,PG,A<br>E,ES<br>G |

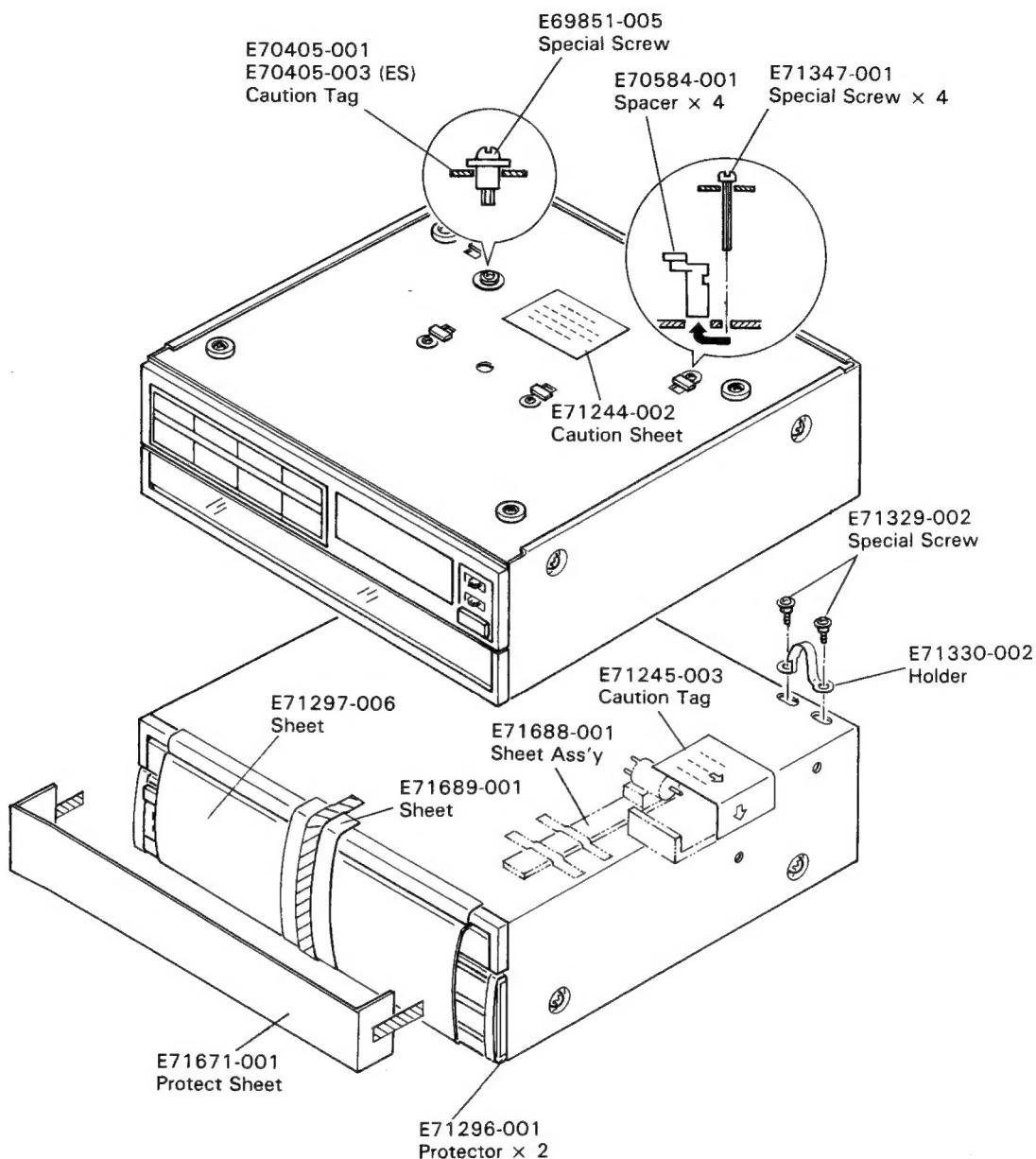


Fig. 13

# Accessories List

| Part Number                                                        | Part Name                                                                                      | Description       | Areas                                       |
|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-------------------|---------------------------------------------|
| E30580-1197A<br>E30580-1197ABS<br>BT20047A<br>BT20025F<br>BT20047A | Instruction Book<br>Instruction Book<br>Warranty Card<br>Warranty Card<br>Warranty Card        |                   | J,C,U,P,PG,E,A,G,ES<br>BS<br>J<br>C<br>P,PG |
| BT20029C<br>BT20060<br>BT20064<br>BT20071<br>BT20046B              | Warranty Card<br>Warranty Card<br>Warranty Card<br>SVC Center List<br>Service Information Card |                   | A<br>BS<br>G<br>C<br>J,P,PG                 |
| BT20044D<br>BT20066<br>E303495-001<br>E35497-019<br>E35497-017     | Service Information Sheet<br>EEC Agency<br>Caution Sheet<br>Caution Sheet<br>Caution Sheet     |                   | J<br>BS,G<br>U,PG<br>P                      |
| E04056<br>E66329-001<br>EWP805-001<br>E66416-003<br>E71090-001     | Siemens Plug<br>EP Adaptor<br>1P Plug Cord<br>Envelope<br>Cap                                  | for Warranty Card | U,PG<br>J                                   |
| E300196-010<br>E300196-010B                                        | Envelope<br>Envelope                                                                           |                   | BS                                          |

## The Marks for Designated Areas.

|         |              |            |                     |
|---------|--------------|------------|---------------------|
| J ..... | U.S.A.       | P,PG ..... | U.S.Military Market |
| C ..... | Canada       | ES .....   | Spain               |
| E ..... | Europe       | BS .....   | U.K.                |
| G ..... | West Germany | U .....    | Other Countries     |
| A ..... | Australia    |            |                     |

# 16. Power Cord Connections in Different Areas

■ for U.K., Australia & Europe

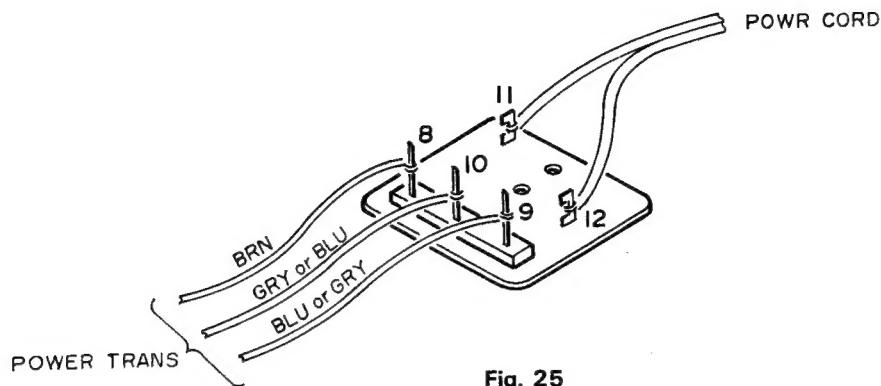


Fig. 25

|    | U.K. A | E   |
|----|--------|-----|
| 8  | BRN    | BRN |
| 9  | GRY    | BLU |
| 10 | BLU    | GRY |

■ for U.S. Military Market & Other Countries

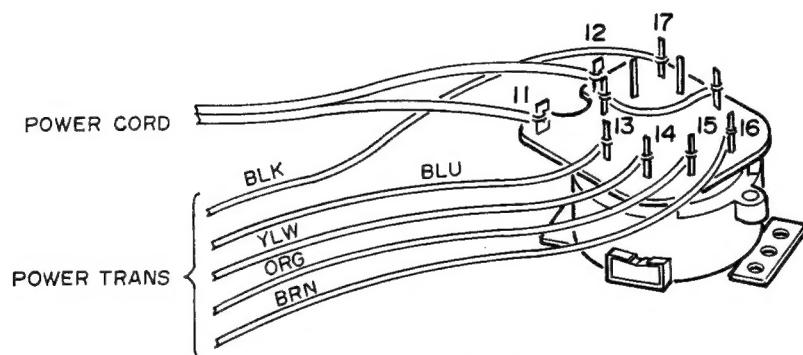


Fig. 26